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THE PREMIER FIELD-MARSHAL OF ENGLAND.

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"An honest, good-natured gentleman, who has much distinguished himself as a soldier."—*Dean Swift.*

LORD GEORGE HAMILTON, fifth son of Anne, Duchess of Hamilton, and William, Duke of Hamilton (so created in 1660) was born at Hamilton Palace, Lanark, and baptised there on 9th February, 1666. On 9th May, 1684, Lord George was appointed captain in the Royal Scots Regiment of Foot, then commanded by his paternal uncle, the Earl of Dumbarton. At the Revolution, George Hamilton joined the standard of William of Orange, and on 1st March, 1690, succeeded to the command of an Enniskillen Regiment of Infantry, lately commanded by Colonel Thomas Lloyd, whose dash, bravery, and success in the field had earned for him the sobriquet of "the little Cromwell." At the battle of the Boyne Hamilton earned his first laurels. The successful crossing of the Boyne by the Williamite forces was chiefly due to some Irish officers of Lord George Hamilton's corps, who had been specially brought to the King's notice by their colonel, on the eve of the battle, as guides who knew the fords of the river. Lord George commanded his regiment at the siege of Athlone; also in the sharply contested battle of Aughrim, where Hamilton's Enniskilleners were in the first line of attack and suffered heavily, he himself being wounded; he was also present at the capture of Galway and Limerick. On the reduction of his regiment, at the close of the campaign in Ireland, Hamilton was appointed by William III., in January, 1692, Colonel of the Royal Fusiliers. He commanded this regiment at the defence of Namur in May and June, 1692, during which siege "the besieged behaved themselves with great gallantry, and the French lost a great many men."[1] At the disastrous battle of Steinkirk Lord George Hamilton gained fresh distinction and was rewarded with the colonelcy of the 1st Battalion of his old regiment—the Royal Scots.

[1] *London Gazette.*

In the closely contested battle of Landen, 19th July, 1693, the Royal Scots bore the brunt of the enemy's attack and suffered heavily. They were also actively engaged during the siege of Namur, where Lord George Hamilton was wounded, though not severely. Whilst the siege was in progress Lord George was promoted to the rank of Brigadier-General (10th July, 1695), but commanded his regiment in person until the fall of Namur. On the 25th November, 1695, he married Elizabeth Villiers, eldest daughter of Sir Edward Villiers, Knight Marischal, sister of Edward, first Earl of Jersey. This lady had held the post for some years of maid of honour to Queen Mary when Princess of Orange, and was a great favourite with King William. Indeed, there is no doubt that she was a "favourite" in every sense of the word, and that her intimacy with the King caused much unhappiness to Queen Mary. If it is true, as Macaulay tells us, that it took all Kneller's art to make King William's "only English mistress" presentable on canvas, it must be undoubtedly true that she was a most fascinating woman and possessed, as Macaulay allows, of mental powers which qualified her to partake the cares and guide the counsels of statesmen and politicians. Dean Swift described her as the "wisest woman he ever knew." She certainly was clever enough to retain the King's friendship long after any unlawful intimacy had ceased to exist between them, and he bestowed upon her by Royal grant, dated 30th March, 1695, all the private estates of the late King James in Ireland (except a small part in grant to Lord Athlone), containing 95,649 acres, valued, or rather over-valued, at £25,995 per annum. Historians have been unduly severe in aspersing the character of Lord George Hamilton for marrying Elizabeth Villiers. He has been accused of a base desire to curry favour in his Sovereign's eyes by taking a mistress off his master's hands, and to advance his own fortune and position. It is very unlikely that this was the case. His birth, position, and rank were all assured, and at the age of twenty-nine love was more likely to be the one predominant feeling in his breast than any base or sordid motive. All the writers who refer to this marriage have, seemingly, been unaware of the fact that the lady in question was a distant cousin to her husband, whose maternal great-grandmother was a Villiers. Whatever may be said, or thought, of this marriage, it turned out a very happy one, and was in no way shadowed by the forfeiture by Act of Parliament of the Irish estates, which only brought in about a sixth of their nominal value and were saddled by two annuities amounting to £3,000, payable to two of King James' former mistresses! On 3rd January, 1696, Lord George Hamilton was created Earl of Orkney with remainder to the heirs of his body whatsoever. In March, 1702, he was made a Major-General, and served at the siege of Stevensvaert this year. In January, 1704, Orkney was advanced to the rank of Lieutenant-General, and, a month later, was made a Knight of the Thistle, which noble Order Queen Anne re-established in December, 1703. On 13th August, 1704, Lord Orkney was at the battle of Blenheim, where he commanded a brigade of infantry, and he made prisoners of war a great body of French troops which had been posted in the village of Blenheim. In June, 1705,

he commanded a detachment of 12,000 men sent to prevent a conjunction of two large bodies of French troops near Liège, and he used such expedition that he seasonably reinforced the Dutch and prevented Marshal Villeroy taking the citadel at Liège, about which his troops were then formed. At the battle of Ramillies, on 23rd May, 1706, Lord Orkney, at the head of a large body of cavalry, was instrumental in defeating the French, who, after a hard-fought battle, were driven from their position and obliged to fly in frightful confusion. "The British horse under Lord Orkney," writes Sir A. Alison, "did not draw bridle from the pursuit till they reached the neighbourhood of Louvain, having, besides fighting the battle, ridden full 25 miles that day." In July, 1706, Orkney assisted at the siege of Menin; and on 12th February, 1707, was elected one of the sixteen representative peers for Scotland to sit in the first Parliament of Great Britain after the Union. This same year Orkney served again under Marlborough in Flanders, and at the head of seven battalions of foot kept the communication open from Meldert to Louvain as long as the allied army lay at the former place. And when they decamped to Nivelle, within two leagues of the French Army, and a battle was expected, the Earl with twelve battalions of foot and thirty squadrons of horse, and all the grenadiers of the army, advanced and charged their rear in their retreat for about four miles and killed and dispersed about 4,000 of the enemy. On the 11th July, 1708, the allies under Marlborough crossed the Scheldt, near Oudenarde, and attacked the French with the greatest bravery. After several hours of stubborn resistance the French were overpowered and forced to retreat. If night had not supervened their whole army would have been annihilated. Lord Orkney was one of Marlborough's generals who on this occasion advocated an immediate advance on Paris, but the great commander saw too many obstacles in the way to attempt it. This is the only occasion on which we find any serious disagreement between Marlborough and Orkney, and it is probable that the former's enemies at home made the most of what Orkney wrote to a friend in Scotland in the heat of the moment.[1] He assisted in covering the siege of Lille, and in November, 1708, commanded the van of the army at the passing of the Scheldt, serving at the siege of Tournay the following June, and taking the forts of St. Amand and St. Martin. On the 31st August (N.S.), Marlborough, anticipating the surrender of Tournay, despatched Lord Orkney with all the grenadiers of the army and twenty squadrons to surprise St. Ghislain and secure the passage of the Heine. On 3rd September, the Prince of Hesse Cassel was sent after him with 4,000 foot and twenty squadrons. On arriving at the banks of the Heine, Orkney found the passage so strongly guarded that he did not deem it prudent to alarm the enemy or reveal the real point of attack by attempting to force it. The Prince of Hesse was more fortunate, as he surprised the passage near Obourg early on the 6th and entered the French lines of the Trouille unopposed, the enemy retreating with precipitation. By a master-stroke of military genius

[1] Eighth Report of Hist. MSS. Comn., Part. I. (letter from Defoe to Godolphin, 3rd August, 1708).

the Prince of Hesse turned the enemy's lines and invested Mons on the side of France. Marlborough rapidly followed the Prince of Hesse with the main body and was joined by Orkney with his detachment. On 11th September was fought the most bloody action of this war. The French Army, commanded by Marshals Villars and Boufflers, occupied a position near Malplaquet, made formidable by treble intrenchments and other works, and covered by thick woods. The allies under Marlborough and Eugene were encamped on the open ground in front of the enemy's position. Lord Orkney at the head of 15 battalions and supported by cavalry on each flank was ordered to advance and force the enemy's intrenchments in the centre. "Lord Orkney then made the attack with such vigour that the intrenchments were at once carried, and the horse following rapidly on the traces of the foot soldiers broke through at the openings between the works and spread themselves over the plain, cutting down the fugitives in every direction."[1] The right and left wings of the allied army were equally successful but the victory was dearly bought, costing the allies about 18,350 men—a number much in excess of the French loss. In 1710, Lord Orkney was sworn a member of the Privy Council. He was present at the siege of Douay in 1710, and commanded 20 battalions of infantry at the siege of Bouchain. Although one of the Duke of Marlborough's favourite generals, Orkney was so essentially free from all party bias and rancour of political hostility, that the Duke of Ormonde, who superseded Marlborough as Captain-General of Queen Anne's forces at home and abroad, obtained for Orkney the appointment of General of the Foot in Flanders, and he accompanied Ormonde to the Netherlands in 1712, and continued with the allied army until the close of the campaign. As a further reward for his eminent war services, Lord Orkney was appointed Colonel of the 2nd Battalion of the 1st Foot, so that he had the exceptional honour of being Colonel-Commandant of both battalions of the regiment he had so often led to victory. On 28th October, 1714, he was appointed Gentleman Extraordinary of the Bed-Chamber to George I., and, on the 17th December following, Governor of Virginia. Orkney was afterwards made Constable, Governor and Captain of Edinburgh Castle, Lord-Lieutenant of Lanark, and, on 12th January, 1736, was appointed Field-Marshal of all His Majesty's forces—his commission to this high rank, then first introduced into England, being dated two days prior to the Duke of Argyll's appointment to this rank.

Beyond the bare record of his war services, the Earl of Orkney has left few memoirs of his career behind him. As a general he was fitter to command a wing of an army than an army itself. He was no strategist, and was much below Marlborough in military genius. At the same time, his military talents were much beyond the average, and as a second-in-command he was a most dependable and successful commander. He saw an immense deal of active service, and he won his high rank and position by his sterling qualities and personal bravery. William III. had the most perfect confidence in him, and when Marlborough was detected

[1] Sir A. Alison's "Life of Marlborough," Vol. II.

in shameless "trimming," the King sent Orkney to Marlborough to formally acquaint him that "His Majesty had no further need for his services." Marlborough's Fusilier Regiment was, at the same time (January, 1692), bestowed on Orkney.

Lord Orkney died at his house in Albemarle Street on 29th January, 1737, and by his special request, named in his will, was buried at Taplow, Buckingham, without any funeral ostentation whatever. By his Countess (died 19th April, 1733, and buried at Taplow) he had three daughters, viz., Lady Anne, married to William O'Brien, Earl of Inchiquin, who succeeded as Countess of Orkney; Lady Frances, married to Sir Thomas Lumley-Sanderson, Earl of Scarborough; and Lady Harriet, who married John Boyle, Earl of Orrery, and predeceased her parents. From the eldest daughter descends the present Earl of Orkney.

A touching anecdote is told of the second Countess of Orkney in her own right, who married her first cousin, Murrough, Earl of Inchiquin (subsequently created Marquis Thomond):—

"This lady was deaf and dumb. Shortly after the birth of her first child the nurse saw her cautiously approach the cradle in which the infant was asleep, and fling down a large stone with all her force upon the floor. The noise it made awoke the child, who cried. The Countess fell on her knees in a transport of joy. She had discovered that her child possessed the sense which was wanting in herself."[1]

[1] "The Scottish Nation," by Anderson.

INFANTRY IN A NEW CENTURY.

By Colonel the Right Hon. Sir J. H. A. MACDONALD, K.C.B., Brigadier-General Commanding the Forth Infantry Brigade.

Wednesday, 6th February, 1901.

Colonel VERNOR CHATER, late Commanding 25th Regimental District, in the Chair.

ONE of the greatest masters of the Art of War, von Clausewitz, in a terse sentence, expressed a great truth, which has been too often forgotten in the training of soldiery. That sentence is, "Theory should, by lucid and rational criticism, prevent peculiar methods from outliving themselves."

It is in the case he was dealing with—that of military affairs—that the tendency to stereotyped procedure is most strong, particularly when a long period of peace produces a soporific effect. Thus it comes about that when war, which always drops like a bolt from the blue, suddenly calls upon the soldiery to show what his peace training has taught, too often armies have to pay in terrible losses, both of men and battles, for the failure of enlightened theory to keep a firm guiding hand on practice, compelling it to change its methods, as circumstances in which they are to be applied become changed from whatever cause. Maréchal Saxe says of the Romans that "they always gave up their usages as soon as they had found better ones." This was one of the great secrets of their success, a faculty for adapting their military methods to the conditions, instead of worshipping the fetish of form with closed eyes. The great Napoleon laid it down as an axiom that the detail of tactical working would change about every 10 years.

The procedure of most countries, and particularly of our own, has been too often quite unlike what these great authorities have expressed. The late Commander-in-Chief, speaking in this Institution very many years ago, said that "It had apparently been our practice in formulating our drill, to go upon the notion derived from old historic battles, and to create a system of drill to meet the circumstances and exigencies of this imaginary battle." He stated that his "view of drill would be exactly the reverse of that process. I would find out what does take place in action—I would find out exactly what an action is from the very first moment a shot was fired, until the position on either side is stormed and taken. I would find that out . . . and then work back from that. . . .

You have to accept certain difficulties; work back from those difficulties, and try to take the sting out of the disorder we know to be inevitable, and, working back from it, deduce laws from it, and formulate your drill from them."

Our tendency has been during long periods the reverse of this, and rather to give the go-by to the consideration of new conditions, calling for new or improved instrumentality. It has been the common practice to ignore the fact that that which was done in the battle of a long past yesterday cannot be done to-day, and that what could not be done in that yesterday can be done and must be done to-day. Enlightened theory, grasping the lessons of practice, and foreseeing the effect of coming change in weapons and their power, was smothered in the wet blanket of official stolidity. The fascination of the existing forms and the easy conservatism which holds that "what was good enough in the Duke's time is good enough for me," combined with the sloth begotten of a long peace, found us in the middle of the century little further forward than we were in the time of the Napoleonic wars. Take an example. The rifle was a well-known weapon early in the century, and we had our Rifle Brigade under Wellington. Enlightened theory would have realised at once that the general introduction of rifled fire-arms would increase the power of armament enormously, and would have seen that if rifling improved small arms, it followed that it would give greater efficiency to guns as well as to the infantry weapon. The theorist had seen this 150 years ago. There was one Robins, who in 1747 wrote thus: "Whatever State shall thoroughly comprehend the nature and advantage of rifled-barrel pieces, and having facilitated and completed their construction, shall introduce into their armies their general use, with a dexterity in the management of them, will by this means acquire a superiority which will almost equal anything that has been done at any time by the particular excellence of any one kind of arms."

Here was a man before his time, and one can well imagine how the military Pharisee of that day brushed him aside, as the Pharisees of old drove out the man who knew and told them of a great thing done, saying, "Dost thou teach us?" The contrast to this prescience of poor obscure Robins is to be found in the short-sightedness of the words of a great warrior already referred to, namely, Saxe; words which were quoted with approval fourteen years before the battle of Waterloo by a learned writer in this country, who gravely expressed the thought that the cross-bow and pike were weapons "not wisely laid aside." Saxe's words were, speaking in contempt of fire-arms, *qui font beaucoup plus de bruit que de mal*—make much more noise than they cause injury. We laugh at the Chinese, who, having had gunpowder far longer than ourselves, still train troops to the bow and arrow; but in degree we, too, have been fatuous in our time. Only in the fifties did the brass gun with its short length and smooth bore, and Brown Bess with her erratic round ball, give way to what science had preached for in vain more than a hundred years before. It may illustrate practically the truth of the assertion that we are slow to adopt a good thing if I mention two facts. One is that there was found in ploughing up the

field of Culloden a revolver pistol on the Colt principle; and the other is that I saw in an old country house in Cumberland, laid as a curiosity on a deep window sill, a weapon dating 200 years back, in outward appearance like the old blunderbuss, with the thickening out of the metal near the muzzle, but the bore of which was hexagonal, and had small lands in the angles, exactly the same in principle as the Whitworth rifle of 1858.

It is in regard to the tactical detail and relative training applicable to the infantry branch of military service that the tendency to viscosity in the flow of ideas has been and is the most injurious. It has been so more or less in the case of all European Armies from the time of the great Frederick, and in our own time from the Austro-Prussian war in 1866, when it first became manifest that the rifled weapon made the processional mode of movement, and the moral effect of external arrangement in closely dressed serried form, no longer applicable as a moral factor, and the shoulder to shoulder boring down tactics no longer a practical factor, in the combat. Yet even the victors in that war were slow to learn the lesson till the loss of 6,000 to 7,000 men in a quarter of an hour at St. Privat, on ground with not more than a mile of frontage, gave a lesson that could not be forgotten, and drove the Prussians to improvised modes of action, which it was well for them were to be applied against badly trained and ill-organised troops. Thus a makeshift was forced upon authority, because authority and sound theory had not got *en rapport* in the reflecting time of peace, which is the time, and the only time, in which they can operate together to the best results.

It is in the case of the infantry that authority is most prone to frown upon the suggestions of theory as "new-fangled nonsense," and upon the man who entreats authority to look ahead, and see what must be provided against, and how it is to be done, as a faddist and a bore. The truth that the principles of tactics are unchangeable is distorted into the illogical corollary that tactical detail operations must be stereotyped. In what are called the scientific branches of the Service it is not so easy to follow frowning tactics, when detail change is pressed on authority. The inventor who has a good thing in weapons, or ammunition, or special explosives, or some important element in equipment or munition, is a gentleman that must be reckoned with. It is easy for authority to pigeon-hole the suggestions of the eager foot-soldier, desirous to improve the infantry machine, and adapt its working to the requirements of the modern combat, and it is natural to think lightly of what comes from a regimental officer, or a volunteer. But a Hiram Maxim, or a Professor Abel, or a Nobel, cannot be treated in that light fashion. If he has a good thing, his market is not limited to Pall Mall. It is with him as with the repulsed pedlar in the story, who said: "Then if you won't, another will." And there is the spectre ahead of a series of enquiries in the House of Commons. This is the kind of question that appears upon the paper—"To ask the Secretary of State for War whether a Birmingham invention known as Bomber's automatic shell-burster has been offered to and accepted by the War Departments of two Continental Powers, and will he inform the House whether this invention was tendered as a

secret communication to the Ordnance Department, and whether it was rejected, and if so, why?"

The poor infantry has no such protection as this. The sphere of invention in tactical handling of the infantry must remain in the region of theory. Maxim, Nobel, and Abel may show effectively what they can do with artificial earthworks manned by dummies, but the theorist in infantry work cannot exhibit the effects of his invention until he is provided with real enemies that it is legitimate to riddle, after he tactically gets at them, or while they are trying to get at him, as these scientists riddle the dummies. And the Secretary of State would be sure to get ready answers through the Intelligence Department if questions were asked. One can imagine him gravely reading a slip taken out of his dispatch-box: "In reply to the honourable and gallant member, I have to say that the system in question was considered by the military advisers of the Department, but in consequence of the recent publication by a distinguished foreign officer of a remarkable paper entitled 'A Midsummer Night's Dream,' in which the abandonment of fighting in extended order is demonstrated to be right, and also of the fact that at the recent French manœuvres large bodies of men in close formation were employed in attack in the open, it has been officially decided that, with all deference to Field-Marshal Lord Wolseley and Mr. Archibald Forbes, 'shoulder to shoulder' is not dead."

If in the new century this country is to make the advance it should in developing the efficiency of the British infantry, and if that infantry is to be as it should be, and as in former days it was confessed to be by our enemies, by the mouth of Marshal Bugeaud, "the finest infantry in the world," two things are essential: first, that earnest thought and study be given to the war questions of the day by earnest soldiers and by earnest students, whether of the Regular Army or not; and, secondly, that the official mind should be as fully and formally directed to the consideration of the problem with all the light that can be got upon it, as that official mind is accustomed to consider with studious experts the scientific inventions to the destructive power of which the infantry must expose themselves. Without these two things, no real progress can be made. And it is for that reason that I have dwelt upon the past, to endeavour, if possible, to convince the official mind from the lessons of history, that the failure to act on von Clausewitz's maxim has done incalculable evil in past days, evil which has caused much loss in blood and treasure and prestige.

The first thing to be done is to formulate, as exactly as possible, the present conditions, that it may be seen wherein they differ from those of the past.

The principal conditions of the modern combat in relation to infantry, are:—

1. The fire-swept space, measured by miles in the case of artillery, and by much more than a mile in the case of small arms.
2. The location of the fire—both in distance and laterally—made difficult by increased range, and often impossible by the use of smokeless powder.

3. The speed of fire increased in a proportion of at least 6 to 1.
4. The possibilities of accurate fire with all fire weapons increased in a very great degree, both by the excellence of the weapons and ammunition, and the improvements in range-finding and sighting appliances.
5. The more effective character of fire from the flattening of the trajectory of all arms, and from the improvements in speed of fire and destructive power, and in the case of the artillery from the development in shell design and explosives.
6. As a result of the changes in weapons, protracted fighting in the preliminary stages of the combat, at distances at which the *personnel* of the troops engaged is not effective as a moral factor, in contrast to the old days in which the engagement did not begin until the opposing forces were at a short interval, so that appearances were a potent factor. Marshal Bugeaud describes the sight of our troops, silent, and from their steadiness like a long red wall when the enemy was only 300 yards off, producing an ardour-cooling effect on the French soldiery advancing with shouts of "*Vive l'Empereur—en avant—à la bayonette.*" All this moral effect by outward appearances is gone for ever.
7. Impossibility of the movement of troops being conducted by the set word of command of officers in high rank commanding several hundreds of men, combined with the fact that as smokeless powder makes the locating of a force difficult, loudly-shouted words of command may reveal the position of troops, which it is important to conceal.
8. Great increase of physical strain, in consequence of the long space to be covered by troops under fire, and the protracted character of the fighting in which enormous quantities of ammunition are expended.
9. Great increase of moral strain caused by the protraction of the severe phase of the combat, combined with concentrated losses, without that power of immediate retaliation—retaliation seen to be effective at the moment—which is always an important inspiriting element in all contests of force.
10. In consequence of these stresses, difficulty in maintaining effective, controlled, and regulated fire, and disciplined action on approaching to and at close quarters.
11. The certainty that, at and after the decisive moment, and at the very time when well-prepared counter-stroke will take effect, there will probably be a confusion of units far greater than in the days of short-range combats.
12. That unless efficient means are found for providing ammunition supply during the engagement there may be failure, excessive loss, and capture, where there should have been success.

In stating these heads, I am open to the charge that little or nothing is being brought forward in the list which is not known already. I admit that. But it is important to gather these things to a focus for purposes of general view; and, still more, it is necessary to keep on emphasising them, because, although they may have taught their lesson, there are many signs that the lessons are not in all cases receiving effect. All these things were true in a certain degree for the last forty years. But even twenty years ago what practical heed had been given to them in the daily routine of infantry work? *Fas est ab hoste doceri.* Let me take the words of a Boer who fought against us in 1881, and who in friendly conversation in a much later year told of his experiences, and expressed his views as to our prospects if we again came to blows with him and his comrades:—

"The red-jackets left their white tents in the morning about 9 or 10, after they had had their breakfast, and formed up. Their red coats could be seen by everyone, their bayonets glittering in the sunshine. The surveyors went and measured out spots where they had to stand in lines; and then they formed up, every man straight. The adjutant came and cocked his eye down the ranks to see that no one was an inch behind the others. They numbered, and the colonel rode up. The colonel was on a fine horse, and had a beautiful sabretasch. 'Men,' he said, 'you see those rocks. The enemy are behind them. You are to go and drive them out.' They marched up in rows. They cheered. All this time we were sitting quietly smoking. As they got near, the commandant called out, 'Men, defend yourselves.' Then we put our gun muzzles from behind a shelter of rocks, took aim, and picked out the officers, and fired. . . . We just picked off all the leaders as they came up." Then the Boer expressed how "greatly we admired the bravery of the English officers. . . . To us such bravery is marvellous, we cannot understand it; but it is not war."

Now, is there anything unjust, anything improperly sarcastic, in these statements? I cannot think so. I have seen at manœuvres in this country, much later than the Boer war of 1881, many instances of the same blind adherence to parade forms, where they had no application. Not more than a dozen years ago I was put in command one day at Aldershot of a mixed force, which included a battalion of a Line regiment. The force was retiring by orders towards a fortified position. When ascending a bank, covered with bracken, waist-high, this battalion, which was retained for reserve purposes, was directed to line the bank at a place selected because there was a turf wall which would enable it to hold on, and cover the retreat of the fighting line, the ground being so steep that tiers-fire was appropriate, and the turf forming a ready-made and efficient shelter-trench. I turned round to attend to something else for the moment, and on turning back, saw, to my intense amazement and disgust, a string of markers out, some in front of the wall, some behind it, and one on the top of it, and the battalion carefully dressed among the brackens, and left standing upright, so that half of it formed a beautiful red streak against the bank that could be seen a mile off, and the other

part which was behind the wall was dressed so beautifully straight that two-thirds of it showed above the turf. I am thankful to say that I have completely forgotten the number and the territorial name of that gallant corps, and if I did remember it I would cut my tongue out rather than divulge it. The scene was a ridiculous one, but it was painfully typical of a system which had become crystallised, and the blame should fall on that, and not on those who were carrying it out in excessive conscientiousness. But unlike the cavalry charge of old, it was, while certainly not *la guerre*, in no sense *magnifique*. It was barrack-square gone mad—a very gross case, but a specimen of one of the effects of our system of drill, and the way in which it was carried out under our mode of inspection.

The truth is that those who had to do with the affairs of the infantry were for generations dealing with conditions in which the glue-pot principle was the dominant factor. The effort was to produce the solid, rigid article—as von Clausewitz expresses it, "held together merely by the glue of Service regulations and a drill book"—as the carpenter, supplied with plenty of glue and nails, can make a broad rigid front out of narrow planks. Solidity, density, rigidity were the aims in building up the infantry unit. I find in the *Military Journal* of 1799 infantry described as "a solid, close body which sustains itself by the density of its several parts," and so late as 1825 a very able military writer uses the words "steadiness, solidity, and compactness," and declares these to be "the true and only strength of the infantry," which was spoken of as "not altogether without mobility." All this was true when it was written, and would be true now if the conditions were the same. It is now the exact opposite of what a true description of infantry work would be. The conditions, as we have seen, have totally changed. But while the conditions have changed, there has been much sluggishness in adapting the training to the conditions. Tradition has dominated where enlightened theory should have pressed its case upon every thinking mind, so that it could not be gainsaid or resisted. It is a curious feature of our national character that it contains two elements which are in very marked contrast. We have an instinctive detestation of change, except in ladies' fashions, and in military tailoring and hat designing, while we have a marvellous power of adaptability when change is forced upon us. One of the most satisfactory features of our national character is, that the evils of the former idiosyncrasy are so often modified by the power contained in the latter. The evils are great, and do much harm, but our adaptability, and the cheerful way in which we acquiesce in the excellence of what we formerly denounced, when we have to assimilate it, is very remarkable. There is a very amusing instance of this to be found in the case of our Infantry Drill in recent times.

In 1872 the following words were published as regards infantry movements :—

"Each man should move perfectly freely, and have fresh air on either side of him. And instead of forbidding the swinging of the disengaged arm, it should be made the rule."

Well, they say that everything comes to him who knows how to wait. The first thing to be done was to persuade authority to give an interval between files in the ranks, to free the body, and give circulation of air, and, above all, to make the soldier feel himself a unit, and not a plank glued into a palisade, an unintelligent look-straight-to-your-front automaton, in which any natural mode of action was a crime.

After much pleading by Sir Lumley Graham, commanding the Royal Irish Regiment, and others, as well as myself, marching with an interval was tried at Aldershot by two regiments in my lamented friend General William Fielding's brigade, under the command of Sir Archibald Alison. They both spoke to me in private of the unmistakable success of the experiment, and I remember saying to them then in 1883, "I have seen to-day part of what I have longed for since I was at Salisbury manœuvres in 1872, and in the words of Napoleon's veteran at his tomb, 'I shall die content,' the rest will come sooner or later." Authority then proceeded to crush the improvement. Strict adherence to the Book was enjoined, military newspapers jeeringly announced that what they called "wet-paint interval," had received its quietus for ever. Officers expressed to me their regret and spoke despairingly. I did not despair. I told them that no real change in the Drill Book took less than a quarter of a century to work itself out, and they must wait. I knew there were those in the Army who saw, and that those who were blind would pass away. First came the abolition of touch. Then, as was inevitable, the wooden arm was abolished and the natural arm restored, and the march at all times became what it should be when the palisade formation has given way to the effective fire formation, when room is given to the soldier, as Sir Lumley Graham expressed it, "to use his arms and legs to the greatest advantage," leading, to quote the Archduke John's words conversely, to the production of "the living organism" instead of a "machine-like Army." Of course the opponents assured us that troops could never march accurately without touch, which, of course, was nonsense, and that every sort of looseness and failure of discipline would result from allowing the soldiers' march to be according to natural action, and not as in a cramped and unpractical exercise. They were deaf to all argument. But *magna est veritas*. The contest is over. The march of the British soldier, and indeed of the soldiers of Germany, and France, and Italy, is now an interval march, with free swing of the arm, the embodiment of individuality in disciplined and intelligent unity of action. That it will remain so is certain, for all that was in use to be said against it, was unwisely said, and is now unsaid. There was no more bitter opponent of these changes than that very influential military paper the *Army and Navy Gazette*, from which I quoted the phrase "wet-paint interval," used in supreme contempt of the proposal to give soldiers free use of their bodies in the ranks. I now take that journal as a witness. At last, an order was issued for all drill to be done with an interval, and with the disengaged arm swinging in rhythm with the step. For the first time, and after very short practice, this was carried out at the Trooping of the Colour on the Horse Guards' Parade on the Queen's birthday in 1896. What said the *Army and*

Navy Gazette, with that display of short memory, so characteristic of journals, and most of all of military journals? "The men stepped with an elastic springiness and a freedom from restraint, with a high step and a smart swing of the disengaged arm, that was exceedingly fine. Indeed it would be difficult to find such marching anywhere else."

After the short but pithy commination service of 1883 in the same print this utterance is good. "Elastic springiness" is good, "freedom from restraint" is good, and "smart swing" is good. When your words have to be swallowed, it is best to do so as if you liked it. There was little of elasticity and plenty of restraint about the touch march, and a swing instead of being smart would have condemned the delinquent to extra "drill till further orders" for unsmart and unsoldierlike conduct.

Surely the time has come, after all that has happened within the last 15 months, for a final endeavour to construct an Infantry Training Book which shall be free of what practical soldiers must know has no longer any applicability to the time and the circumstances. May we not ask that in a new century we shall not be left to rattle the dry bones of what has no longer any of the soul of war in it? Is it too much to expect that there be an end once and for all to tinkering, and that the best men that can be found be put to the task of framing a system of infantry training, which shall no longer contain what Rogniat calls *une abondance stérile* of useless exercises, what the late Field-Marshal Sir Donald Stewart called "useless lumber," and the late General Gordon called "rubbish." General Gordon's words are pithy, and therefore I quote them. Writing to a friend regarding the training of an infantry force, he used these words:—"All rubbish of goose-step—right-face, left-face—in which our Army drills delight, should be left out."

The goose-step is still with us. It is about the best specimen of the military fetish that exists; a lamentable instance of unenlightened idol-worship. I daresay the proposal to cut it absolutely out of the Drill Book will make "each particular hair" of many a barrack-square devotee stand up in holy horror. His Koran says that "The object of the balance step is to teach the soldier the free movement of his legs, preserving at the same time perfect squareness of shoulders and steadiness of the body. No pains are to be spared to attain this object."

The theory was that men should march with a body, head, shoulders, chest, trunk, and arms immovable, carried on legs, the feet of which came to the ground, heel and toe together. This was one of those traditions coming down from slow march days, when what might be true of very slow marching was unscientifically asserted to apply to ordinary practical movement. It was nothing short of absurdity to state—as has been done for probably a century or more, and is still stated in the Drill Book—that any such thing is part of "what forms the very foundation of correct marching," unless marching means something contrary to natural laws of locomotion. Yet it was thought that no greater heresy could be propounded than to say that in marching, as in walking naturally, the heel comes to the ground first. Drill experts would tell you no—that their mode of instruction was intended, and was successful, in bringing

the foot into a position parallel to the ground and putting it down in that position, and that to do this was the only way of using the limbs that was right. Any scepticism on this point was met with a smile of pity at the ignorance displayed of military matters. They had been taught to teach that. It was good discipline to accept what they were taught. They taught it in their turn, and they believed what they taught. It was a blind obedience, for what they believed was false. The demonstration of its falsity is unanswerable. In the play of the "Octoroon," where a crime is proved from a camera plate, the estate overseer truly asserted that "the apparatus cannot lie." It cannot, and when photographs came to be taken in most minute fractions of a second, it was at once seen that many accepted theories about the motions of animals, including man, must be rejected. I have examined very many photographs and reproductions of photographs of soldiers marching either on the road or in marching past on the parade ground—including pictures of the Guards, the models for the Army. In all these the theories of the goose-step are belied, even as regards slow march. The toe and heel are never brought into a parallel with the ground, and so set down. The heel comes first on the ground, and the toe follows. I do not say that some men cannot do it when marching in slow pace, particularly an officer steadied by carrying a heavy standard in front of him, but I say that it is not done by troops, even in slow time, and is not and cannot be done in quick time. And an appeal to the report of the camera is unanswerable. I have in my hand a snap-shot of the Guards marching past in slow time at Dublin Castle. It is conclusive. The truth is, that the goose-step is the complement of slow march, and if it is at all defensible in association with it, it has no ground of existence apart from it. Slow step is now no longer a factor in practical drill. This has been seen in Germany, and the balance-step has been cut out of their Drill Book. But tradition lingers. As Köppel, the German author, wrote more than fifteen years ago: "Slow march and its barbarous cousin the balance-step are unknown to the *Reglement*. In spite of this, the slow march still lords it almost unopposed over the whole of the infantry." Discipline is set at defiance to keep up the obsolete and useless.

Thus they have officially abolished the practice of the goose-step, because they abolished slow march, to which alone it could be applicable, yet, in breach of orders, slow march is practised, and we, having abolished all practical use of the slow march, still keep the goose-step, ordering that no pains are to be spared in teaching it. However, this last rag of the obsolete will probably not survive a new edition. For as we have seen, it is amazing how those who wring their hands in despair at any suggestion of adapting system to conditions, recover their equanimity when it is accomplished. They say, like Chatham, "never, never, never," and when they have said it in vain, they complacently bless, where before they cursed. We shall awake some morning and find the time-devouring goose-step has gone to the scrap-heap of obsolete machinery, and there will be no mourners.

That such things as have been referred to still present themselves in our training school shows how little philosophical consideration has been brought to bear upon our system of instruction, and they have been dwelt upon in the hope that it will be realised that just in proportion as development to suit changed conditions has in the past been slow and carried on in a piece-meal fashion, often to our great loss, so does it become clear that we have reached a time when the whole of our system as expressed in the Infantry Drill Book must be scanned paragraph by paragraph, and not merely worked on at one or two desks in Pall Mall in the way of an overhaul, but shall be so amended and adapted that the externals of drill shall have their proper relation to training for the field, instead of being as they so often are now, remnants of what once were actions and formations relating to war, but which are now a mere means of wasting valuable time, and which it is only misleading officers and men to present to them as a part of war training. And in lieu of the obsolete and useless, which we shall thus get rid of, there must be incorporated those things which modern conditions have created a necessity for, and modern science and invention have presented us with. We have suffered much from the failure to act thus in the past. If we do not take the lesson now, at this great opportunity, if now that our system has been thrown into the fiery crucible of war we neglect to take away all the dross and supply its place with new and sound material, we shall act criminally, and a coming generation may have our sin visited upon it in some day of trial. We have now a golden opportunity, at the beginning of a new century, when the nation is roused to the necessity of improving our military machinery, and is willing to make the sacrifices needful to attain the great end in view. May it not be lost or frittered away in once more turning over our old garments and patching in with new cloth here and there, to the certain making of the rents worse.

All these things have been dwelt upon because experience has taught that to rouse the average military mind to the necessity of considering change is not easy, and that, without this, suggested adaptations to meet new requirements will fall upon listless ears. In the earnest hope and belief that now in this year 1901 a real and drastic overhauling is about to begin, I propose to draw an outline of the developments which appear to be desirable in our system of training, organising, equipping, and clothing our infantry force.

First in order, the Instruction Book must be cleared of a great deal of the clogging element of obsolete forms, the drill still more simplified, and the work of the barrack-yard once more brought into direct relation in all its parts to the possibilities and requirements of the field. What is not relative to war must disappear from the regulations for ordinary training. To this end, the first thing to be done is to make the barrack-square drill have less association with mere moving about, and more association with fire exercises, and to put these two things in distinct and unceasing relation. The soldier, from the first day of his enlistment, onwards through all his training, must have the rifle and its disciplined and intelligent use as a fire-weapon made the very essence of his life as

a soldier. He should be taught something about his rifle on the very first day of his joining. It must no longer be the case that he shall be a soldier for weeks without having any association with the fire-weapon, and after he has got it he shall constantly find at drill after drill that the fire-weapon is made a mere burden to be carried about, which he must shoulder and slope and order, there being no association of its use for fire with his advancing and retiring, his halting and fronting. Something of development in accurate and disciplined use of fire must be learned or practised at every drill. At every drill the rank and file must be exercised in training for fire, and the leaders of the smaller units be exercised in the directing of fire, and those under them accustomed to receive and to assimilate such direction. Commanding officers should inculcate into all their subordinate commanders the conviction that every hour spent at drill in which the rifle has not been kept before the mind of the soldier as that for the intelligent use of which he is a soldier at all, and his capacity to use it effectively stimulated by exercise, is an hour more or less wasted. Great importance attaches to this, both morally and practically. The idea that musketry and drill training are two separate things, and that the former is not part of the daily business of the soldier is harmful, and has in the past done much evil. The officer has not been sufficiently impressed with the idea that fire-work is the essence of the foot-soldier's business, and that except towards an efficient bringing of fire to bear, all the marching by the right and by the left, and front forming, deploying, etc., are not practical factors in a soldier's business. Thus the commander, whether of large unit or small unit, and the men composing the unit have not been brought into real and constant association and routined in fire exercise together. Routine has been constant and wearying in matters not constituting modern field business, and the tendency has been to dissociate drill from field aptitude and fire exercise, instead of bringing movement and fire-exercises into the closest and most constant daily association.

The next thing that is necessary in the preliminary training is that the drill by shouted word of command shall be used only occasionally, and at the commencement of the drill hour, and that there be constant training in intelligent movement in response to observed signal. In these days of long-range accurate fire-arms, the stealthy mode of the hunter is more appropriate than the war shout of the close combat, and the shrill note of the bugle. When rifles are deadly at a long distance all shouting or bugling is dangerous. Surely, the present war has made this plain by sad experience. In an open country the presence of troops may be disclosed to the enemy over miles of distance by an ordinary barrack-square yell, or the toot of a bugle. Last summer, in camp, I heard on one occasion, when sitting in my tent, the word of command of a captain, who was out manœuvring against another at a distance of three-quarters of a mile beyond a thick wood. When he got excited the practice of the drill-ground returned upon him, and, although the instructions were to work by signal, he shouted, and revealed his presence to his opponent. It was an instance of the certainty that what is done at drill will be done in the field.

I fear we must believe from all we hear, that the shouted word of command has caused terrible losses unnecessarily in the present war, nay worse, that sometimes the misleading shout or bugle call used by a cunning enemy has spelled disaster. The new conditions of war call for leading, in which on a quiet note from the whistle, every eye in the unit shall be on the leader, trained to understand his signal, and to intelligently respond to his leading in absolute silence, no word or signal coming from elsewhere taking any effect, each sub-commander down to the lowest group leader keeping his sub-unit in hand, so that what is desired may be executed promptly and efficiently. It is astonishing how in a day or two troops can be got to respond with intelligence, and can be manœuvred without a sound being heard. And it has this great moral value that everyone can feel that he is practising something real, applicable to actual service work, which no intelligent man can do if he is marched about for days and weeks in close formations with perpetual forming to artificial fronts, and constant halting and dressing into straight lines by this flank and by that flank, in response to loudly-yelled commands, accompanied with unceasing injunctions to look straight to his front, in weary monotonous repetition of what never will be done, or indeed can be done within 2,000 yards of an enemy under modern conditions.

Such work by communication of signal will be quite as effective in inculcating and keeping up the spirit of instant obedience as all the shouting of the present barrack-yard. And in relation to movement by visible signal, I would ask, Are we never to get rid of the arbitrary, artificial, and useless drill-ground "Front," which hampers free movement, and complicates what should be simple? Some years ago I pointed out that in our Infantry Drill-Book in the definition clause three separate and contradictory definitions were given of the word "Front," I got half a loaf in the substitution of the correct word to express the extent of ground covered laterally by troops, viz., "Frontage." I still ask for the other half of the loaf—the abolition of the second alternative definition of the expression "Front," which is said to be "The direction in which soldiers face when occupying the same relative position as when last told off." This is a very faulty definition, and is made worse by the foot-note: "This definition is retained for purposes of drill, but it must be remembered that even at drill 'Front' means the direction of the enemy." Surely this is nonsense. Suppose a corps is standing to its front in the sense of this definition, then an order to change its front would be an order to turn away from the enemy, unless the enemy was obliging enough to conform. If a column, which is fronted to the east, is supposed to have its front to the enemy, then if it forms into line, the line will not front the enemy. Such a definition is hopelessly bad, and shows the absurdity of having an artificial front fastened on to a body of troops, necessitating two inconsistent definitions of the same expression. And it is also misstated, for if ranks have been changed, then the front under subsection (*b*) is not an arrangement of the men in the same position as when last told off. What a blessing it would be if troops could be handled always by naming or indicating what was to be done by ordinary language

or signal, using "right," "left," or "about," or "right up" and "left up," instead of speaking of a front which is fictitious, and obscuring the true meaning of "front," viz., the direction towards which action, as distinguished from mere movement outside the range of action is to be taken. In movement by signal there can be no artificial front. And as movement must be by signal, the artificial front must go.

The next point I would emphasise is the importance of developing control as distinguished from command, by the formation of groups under group leaders, and making this an integral part of the organisation. What is wanted is the handful of men that the group leader can control personally under his superior by individual observation. This mode of working should be constantly practised. It has been acknowledged on all hands that this is desirable and ought to be done, but it is not done; it still requires development, and should be made a distinct feature in the next Infantry Drill-Book. Dispersing of a unit into groups; rallying into groups after complete dispersion; and reforming the groups and then reforming the unit, should be a regular exercise. It would be found highly disciplinary, and the practice given to group leaders would make them most valuable on service, and aid the commanding officer in selecting the best men for non-commissioned rank. There is no way in which the all-important elements of tactical cohesion and of fire-control can be more efficiently developed than by the use of a system of grouping. But it must be a constant use during the training, and made matter of daily practice.

It is not necessary to say much upon the next head, which is Physical Training. Great attention has been given to this of late years, and with the best possible results. The present system has been most scientifically devised to develop the body and its different organs in the best possible way, and the teaching is kept in such a disciplinary style that as regards the inculcation of smart and prompt obedience it may well take the place of much of the present flesh-wearying repetitions of the drill ground. The recruit will get all that he requires of training in prompt obedience in an interesting and unmonotonous manner, while at the same time his physique is being healthily developed. The present war has shown that the troops sent out were in good hard condition, in contrast to what was the case in another part of Africa at an earlier date, in the case of corps in which the adjutant and sergeant-major were the *dii majores* of the instruction.

The next matter which is of great and ever-increasing importance is mobility, which involves in its consideration questions of equipment and transport, and also what I shall call artificial mobility. The present war has made it plain that the British soldier can still do wonders in getting over the ground on foot. The continuous marching that has been done on many occasions has equalled if not surpassed the feats of Crauford's Light troops. But it has also become manifest that no infantry marching, however magnificent as a feat of pluck and endurance, can give the results it did in former days, if your opponent has higher mobility from being so organised that his infantry is carried from place to place at a

speed greater than that of foot-march. If this was seen in the earlier stages of the war, it is being seen still more forcibly now. For while we have a very large army of infantry in South Africa, we cannot dispose of the remnants of the Boer force, without, as we are now doing, organising and assembling for the final operations a strong force of infantry having a higher mobility than ordinary foot-soldiers.

Now, we have four means of increasing mobility, and let us be thankful that as the primary object of all military organisation is home defence, that in this country all of them are available, and the country itself affords the best means of making advantageous use of them. The four are: railways, motor vehicles, bicycles, and horses. Perhaps some may wonder that I put horses last. But I do so advisedly, for of all the four the horse is for home defence infantry purposes the most expensive, the most difficult to provide for, the most perishable, and the slowest. That we shall always require a large contingent of infantry mounted on horses is certain. For there are many occasions to which mechanical mobility is not satisfactorily applicable. Nevertheless, we shall commit a grievous error if we confine our efforts in the direction of increased mobility for the infantry to the organisation of a horse-carried force only.

It is not necessary to say much about railways. All I shall say is that for home defence we are probably better provided in that respect than any of the Continental great Powers. Our facilities for transferring troops from point to point, up and down, or across the country, are excellent and ample.

But in the near future a new development of mobility by carriage is certain to take a high place, and in a country so well intersected by good roads as our own, to prove itself to be of very great tactical value. I mean road power traction. Time does not permit that I should enlarge upon this tempting subject. It is only possible to give an outline of what may be expected. Motor vehicles, travelling at the rate of 20 or more miles an hour, will give great facilities for seizing advanced points, holding them while troops are coming up in support, holding on to cover withdrawals, and transferring troops from one part of the front to another or to a flank. The vision is of steel-plated motor wagons with machine guns mounted on them, working in aid of the infantry by conveying groups of them rapidly from point to point, forward, back, or to a flank, acting as the guard of bicycles when cyclists are engaged off the road, covering their withdrawal when necessary, or bringing forward their bicycles when they advance, obviating the present difficulty which handicaps the cyclist, viz., that his vehicle has to be left at a fixed spot, to which he must return. The development of the road tractor for war service, both combatant and transport, is one of the most important matters for immediate consideration, going far beyond my present subject. That for the infantry branch of the Service its importance is very great indeed will, I hope, be realised. In the motor carriage we have means of locomotion in which high speed is attainable and can be kept up, the fuel for the driving being small in bulk and light in weight, while the motive power is not limited by any considerations of fatigue or feeding and

watering divergencies and stoppages. It may also, looking to the speed with which a power carriage can go back and forward, be the means of, in great measure, overcoming the difficulty of infantry ammunition supply, which is daily becoming a more important factor in the combat. Motor traction, as applied to war, would furnish material for a full lecture by itself. Its importance cannot be over-estimated.

The development of a large cycling force is one of the most importan matters connected with our Home Defence. I presume that no one doubts this, and it is unnecessary to enlarge upon it. In no other country can a cycling force be more useful in view of the intersection of its whole surface by roads. The combination of cycle and motor carriage will, as has been pointed out, be of very great value. General Maurice has successfully experimented in this direction, and his report is most encouraging.

As regards the mounted infantry, I would suggest that a certain number of horses should be made part of the establishment of every infantry regiment, and that during the year at least one-half of the strength should receive six weeks or two months training in riding and mounted infantry exercises, two men being attached to each horse, and in the exercises one-half of the men alternately doing foot duty. What is wanted is, that a large number of the infantry should be able to ride, manage, and take proper care of horses, and in this country, where there is so high a sporting instinct, I feel sure the soldier will cheerfully, for a month or two, take care of a horse, in preference to constantly spending hours messing with pipe-clay and polishing up a very unnecessary number of buttons, or going through the deadly monotony of guards, parades, and "fatigues."

Lastly, let me say a word or two about dress. The subject is a large one, and more important than most people think. The question what can be got out of the soldier, without his being lost to the Service, temporarily or permanently, depends more on what he has to carry, and how he has to carry it, than upon many considerations which authority has hitherto deemed all-important. The subject demands a full and unprejudiced inquiry. What I have to say is in the light of a question I read in an able military work: "Why should the soldier be the only working-man in the Empire whose dress is entirely unsuited to the work which he is called upon to perform?" I shall touch on two points only. The first is, that the soldier should be able to free his arms from covering, whenever the weather makes this a natural thing to do. I repeat a suggestion which I made some years ago, and which has not yet passed the being-jeered-at stage. It is, that the soldier's jacket should be made with slightly projecting wings, and that the sleeves should be inserted and buttoned below these wings, so as to be easily removable, and that they can be carried separate. The uncovering of the arm in warm weather is one of the greatest reliefs possible to a man who has to exert himself. It is done by the working-man all over the world. And nothing will refresh a tired man so much as being able when water is found to apply it from his elbows to the tips of his fingers. Thus the soldier, who has to work hard

and carry a good deal of weight, would get a very important refreshment and aid to resist fatigue, which his present sleeve unnecessarily increases. He has a right to relief, seeing that he cannot in war have an eight hours' day, and may have to wait long for rest and food. I am led to believe from what I see in the illustrated papers that at the war a good deal of work is done with bare arms, and I would fain make it possible for the infantry soldier, when wearing his jacket, to free his arms.

The other point is the head-dress. There again experience has always been set at nought, the course taken being the most stupid and reprehensible that can possibly be. It comes down to us from the time when hard hats reigned supreme, when gentlemen went out to shoot and cricketers batted and bowled in tall hats built on iron frames. We have at one time pulled the hat in at the top, and made it like a French shako; at another, and, I suppose, because the Germans beat the French, we have rounded it off at the top, and put a ridiculous spike in it, making it into a bad imitation of a bad hat, the Pickel-Haube. But, through all these changes, the part that touches the man's head remains the same—a hard, metal-mounted, non-porous glazed pipe, that can only rest on the head in one position, is comfortless when on, troublesome when off, oppressive in summer, cold in winter, gives no relief from perspiration, and forces it all down the face—the worst device possible for a shooting soldier—a miserable testimony to human perversity, expensive, pretentious, and inconvenient up to the limit of human invention.

Seven years ago, I said publicly that "the soldier should have a head-dress such as all sensible men, who have liberty to wear what they please when they are taking strong and trying exercise, with exposure to sun, adopt of their own choice. The white man, all over the world, wears a soft hat with plenty of brim. Whether it be a felt wide-awake, or a tweed deer-stalker, or a broad Kilmarnock bonnet, or a plaited seaman's summer hat, a flexible head-dress, well brimmed, is the choice of all men who have to endure physical hardship. Therefore I hold it to be sound logic that, in a time when the fullest strain of the soldier's powers may be called for, and it is essential to relieve him from all unnecessary pressures which will diminish his powers of mind and body, we ought not to be ashamed to take a hint from the ploughman, the sportsman, or the backwoodsman."

I was jeered at, and I tried to wait as I ought to wait, and am thankful I have not waited in vain. It is certain now that the hard hat of all shapes is doomed, and will disappear from the drill ground as it disappeared half a century ago from the cricket field and the golf links, the cover and the river. And when we get a sensible hat, we may also hope to get rid of the Lilliputian pork-pies, and small slices of orange, called forage or fatigue caps, which some call smart, but which any sensible person would call ridiculous.

There is no time to speak of equipment, which certainly must be modified, and especially in the mode of carrying ammunition, and in the cutting down of load to a minimum.

Allow me, in closing, to express the earnest hope that no time will be lost, and that before the lassitude of relief of tension falls on us at the close of this war, full and practical examination will be made, and sound decisions reached in regard to the all-important development of the infantry for whatever it may have to encounter in a new century. This struggle in which we have been engaged is invaluable to us in two respects. It has given us practical experience of war under the latest conditions which no other European nation has had the opportunity of acquiring, if we exclude poor broken-down Greece ; and it has done for us what is perhaps even a greater thing, indeed, as I think, of incalculable value. It has supplied us for the future with a boundless field for the practice of manœuvre and field firing exercises, in the very centre of our vast Empire, so that we can give training in a real sense to large bodies of troops, without injury to land, and with the effect of bringing much money to a rural population. The necessity for many years of having a large force in South Africa, instead of being as some think a loss to this country, will be very great gain. We shall always be able to train troops within easy reach of home and of India, and in a good climate, as we now cannot train them except in the trying climate and at the great distance of India. Can this addition to our military advantages be over-estimated ? I do not think it can. But one thing is necessary if the full benefit is to be reached. We must re-organise our whole system of training to what Guibert describes as *relatif à la guerre*. We must cast out of our system what is inapplicable to the conditions which exist, and discipline our troops by what is useful and practical, remembering—I use Colonel Maude's words—" That discipline is the product of intelligent drill—not the same thing as the mutual hypnotisation which used to take place in our barrack-squares."

Colonel J. A. FERGUSSON, *p.s.c.* (late Rifle Brigade) :—Those who are acquainted with the service and the writings of the right hon. lecturer expected to hear an entertaining and suggestive lecture, and have not been disappointed. More than twenty years ago " Macdonald on Tactics " was a text-book at the Staff College. When I had the honour of being associated with the Volunteers in Australia we adopted his method for our extended order drill. It never failed us in any ground ; it could be learned in half-an-hour by the dullest recruits—and recruits out there were seldom dull—and when I came back in 1883 I tried to get the authorities at home to accept it for our home Army. It was tried at Aldershot and it was approved by every commanding officer, and I have never yet ascertained why it was not accepted. Colonel Macdonald has done the Army good service for many years, and I am very glad to have this opportunity of acknowledging the great help his valuable book was to the Volunteers of Australia. I am unable to follow the right hon. gentleman, however, in some of his remarks to-day, and I have noted a few points on which, if I do not exhaust the patience of the audience, I should like to comment. In the first place, I think the lecturer has rather set up a man of straw in order to knock him down. As regards the principal conditions of modern combat in relation to the infantry, those thirteen principles have been accepted by the Army for a considerable number of years : certainly they have been taught for many years past at Sandhurst. But no doubt—and I hope we shall hear the opinion of some officers who have been at the seat of war—the present campaign will modify our ideas very much as to the distance at which men are safe in the presence of the enemy. We have been in the habit of teaching that men should get into extended order at least half a mile from the enemy. We shall have to double that, as the

lecturer states to-day. Troops cannot approach the enemy, except in extended order, within a mile. But, is there not a risk, in adopting changes hastily after the present campaign, that we shall be misled by the very exceptional character of the enemy whom we oppose? We shall never again, probably, be opposed by an enemy the whole of whose Army consists of mounted infantry. I am quite sure the authorities in making changes, which they will assuredly make, will not be carried away too much by the experience of this very unprecedented campaign. No doubt the supply of ammunition in the field is a most difficult question, one not solved yet. Perhaps the lecturer's idea of bringing these very modern machines into use, the motor cars, to help the question of ammunition supply might be a sound one. I cannot help saying that I think the lecturer's experience at Aldershot of a regiment which formed up on the highest possible ground was an unfortunate one. It must have been a very badly drilled regiment. More than thirty years ago, my own commanding officer, now Sir Julius Glyn, taught us how to utilise cover, and woe betide the man or company commander who halted a few yards in front of cover or a few yards in rear. I cannot think that the unfortunate specimen which the lecturer has brought to our notice to-day is at all an example of the drill of the Army. All regiments must have been taught for many years past how to utilise cover. I entirely agree with the lecturer about the value of loose formation in drill: that is not a very new idea. Many years ago my own battalion in India was habitually drilled, especially in the hot weather, without markers, and the men used to keep their dressing quite as well at half interval as shoulder to shoulder. I suppose I am very old-fashioned, but I am not quite sure that I should be glad to see the goose-step go even now. The lecturer is accustomed to very exceptional recruits. He has to do with magnificent material in Edinburgh, but happily we still get a good many country-bred lads, and the ordinary yokel when he joins is hardly a man into whose hands you can at once put the rifle. I am sure we shall be all glad to see the period shortened if possible, but we must have a period of setting-up drill, and I am not quite convinced that the goose-step is the worst form of setting-up drill. Physical training of course is good, but it is questionable whether physical training will teach a man who is accustomed to shamble behind the plough how to lift his feet. Then as regards shouting the word of command; I thought shouting the word of command had been a long time obsolete. In my own regiment for many years the commanding officers always said to us: "Now, I do not want to hear a single word of command; whistle and signal": I thought that was the custom in the Army. There may be eccentric officers still left who will get markers out within 500 yards of the enemy, but that is not the rule of the Service or what the authorities want us to do. As regards the ever-increasing importance of mobility, that is certainly one of the lessons we have learned in the war. But perhaps we shall never be again opposed to such a mobile enemy. With regard to motor vehicles, they are in their infancy; we have hardly got accustomed to the smell of them yet! Is it not a little premature to remodel our tactics to suit a vehicle which is still under suspicion, and which is hardly an accepted means of locomotion yet? However, I am not dissenting from the main conclusions of the right hon. gentleman, though I offer these small criticisms. I am entirely at one with the lecturer in essentials, and I think it is a most valuable thing that attention has been drawn to the necessity of having more mounted infantry, and real mounted infantry: not taking your picked men from the infantry battalions and half training them as mounted infantry, but having a large number in our Service of real mounted infantry. Somebody wrote to the papers the other day and said rifle regiments ought to be turned into mounted riflemen. As a rifleman I should be very sorry to see the *chasseurs-à-pied* abolished, but we must have a large body of mounted infantry. We must have five or ten times the number of trained soldiers we have got. That is the real danger and difficulty of the country, that we have not got the men. Give us the men and we will train them fast enough. I should like to see the whole country, every able-bodied man between the ages of eighteen and thirty, *every* man, put through the Militia. I think the real lessons of the war are: more training in scouting, more practice in entrenching, and that every infantry soldier

should carry an eatable ration in his haversack, and no man should ever go into action with only the iron ration that he cannot eat until he gets hot water.

Colonel E. T. H. HUTTON, C.B., A.D.C. :—I should like to convey my very warm congratulations to the distinguished lecturer for his extremely able paper and for the very advanced views which he has put forward. I daresay he will recall the fact that nearly twenty years ago he co-operated with me in pressing forward several of the points on which he has laid so much stress in the paper which he has read. I think it is only fair to remark that a very large number of important changes which he proposes have either in part or in whole been adopted. Certainly, the principles which he advocates are universally accepted by all soldiers at the present day who are in active employment. I think that the lecturer has perhaps laid less stress than he might have done on that principle of military organisation which is so vital to success on the field of battle. I am sure that the omission is an oversight, because it is a question which he and I have discussed very often in former days, viz., that the real secret of the steadiness of men in action and of the disciplined handling of men under trying conditions is that the administrative formation unit and the tactical unit should be identical. He lays great stress very properly upon the advantages of a group system. I should like to be allowed to emphasise his remarks in the strongest possible manner, and I say emphatically, that the whole secret of success of leading troops in war under the conditions which now prevail depends on the decentralisation of authority to the group leader and to the individuality group itself. This principle more especially holds good with mounted troops, with whom I have had perhaps more experience during the last twenty-five years than falls to the lot of many. The all-important fact which the right hon. gentleman has not dealt with as strongly as I think he might have done is that this group system must be accepted as the administrative as well as the tactical unit of organisation ; that is to say, that the sub-unit or group in barracks, in camp, or in bivouac, must correspond with the sub-unit or group on the drill ground, and on the field of battle. The right hon. gentleman has laid great stress on the importance of a development of loose formations. The tactical success of the British Army in the future depends on our developing this system of loose formation, and on our being able to manœuvre and work our troops, whether in large or in small numbers, with the greatest possible facility, in extremely extended formation. The sooner this fact is realised and accepted the better. The right hon. gentleman finds fault with us soldiers of the present day for not having made further developments and greater changes. With all deference to the lecturer, I venture to think that no European Army has made such developments and changes in tactics of infantry and of mounted troops as our Army in South Africa has done in the last fifteen months. I can only say that in 1897 I attended the German manœuvres and the French manœuvres and there I saw the very tactics, which the lecturer scorns, were still upheld and practised by all the leading military authorities and influential soldiers throughout Europe. It is not much to be wondered at, therefore, if the British Army has not yet adopted all the very advanced theories which the lecturer has propounded. I will say this, however, that there is a very large school of British officers who accept not only all that he says, but even more, because during this late campaign our practical experience has shown us absolutely as a certain fact, that the close formations of the early part of the nineteenth century are perfectly inapplicable to the tactical formations required for the field of battle of the present day. The sooner we adapt our Drill Book to the innovations which are necessary to success on the field of battle in the future, the better for the British Army and the British Empire. The lecturer has referred to the adaptability of the British soldier and his strong individuality. It has fallen to my lot to have considerable experience of the organisation and training of our colonial armies, as well as our armies at home, and I think that you cannot touch, except with a very careful hand, anything that affects the discipline of the soldier in the field of battle. The last speaker has alluded to the goose-step. I am not in favour of the goose-step, and I am in favour of the abolition of a large portion of the existing Drill Book ; but I hold most strongly that if you are going to have the British soldiers of the past emulate the deeds of their fathers, you must maintain a

stern and relentless discipline on the field of battle. This all-important condition is only to be achieved by a great attention in the initial stages of the training of the soldier, by emphasising in the strongest possible manner the steadiness of the man when he stands at attention, and his absolute silence under all and every circumstance. I should be prepared to sacrifice much to insure these points. But, with our colonial armies, especially where you have a very high degree of intelligence, and with our Volunteer Services which are similarly recruited, you have no difficulty, really, in maintaining a very high standard of discipline indeed if you adhere to principles intelligently explained. The two principles which are all-important for success in battle are firstly, a stern strict discipline—an effacement of the individual when acting in mass, and secondly, a high degree of individuality and self-reliance on the part of each soldier when acting by himself. As regards the first, the instinct of discipline which must be ever present to a soldier can only be gained on the drill ground, and should be imparted at the beginning of his military career. Therefore, if the lecturer will forgive me for saying so, I must beg of him to be very careful indeed how he touches, even indirectly, this important factor, viz., the steadiness of the men when acting in mass and the self-effacement of the individual at the critical moment on the field of battle. As regards the second, viz., the development of the individuality of the soldier—an all-important factor also on the field of battle—we have to recognise that extended formations necessitate the strongest individuality and the highest degree of self-reliance which we can obtain, subordinated also to the ever-present instinct of discipline to which I have alluded. We require, therefore, a system of drill and training which shall be based on these two principles. The author has alluded to the elimination of a large portion of the Drill Book, and has commented upon many of the obsolete forms, and especially upon the handling of arms. All practical soldiers agree, I think, that we could perfectly well simplify the manual exercise, and that the Drill Book might with advantage be reduced in bulk. The simplification and the curtailment of our military manuals affect not only the well-being of the Regular Army, but the efficiency of the Armies of Greater Britian. It is a point upon which I think perhaps those who undertake reforms here in London lay hardly sufficient stress, that the slightest change made here at home reverberates through the whole of the Empire, and extreme difficulty at once arises in dealing with it. The lecturer has alluded to mounted infantry. No doubt he will recall the fact that seventeen years ago he was one of the strongest advocates in pressing forward this question also. In spite of the strong advocacy of Lord Wolseley, the adoption of a system of mounted infantry was only accepted by the Army after many years of argument and discussion in this Institution and elsewhere. The importance of a detachment of mounted infantry forming a portion of each infantry battalion, cannot be over-estimated. I feel perfectly certain that my recommendations of 1886 and the following years will ere long be adopted, and that as the result of this campaign we shall find that each infantry battalion will be provided with a small body of mounted infantry. Each infantry regiment will thus utilise its mounted men for all its scouting and reconnaissance. These duties must inevitably be carried out by mounted men under the new conditions of war on account of the great distances that have to be covered, and the difficulties of ascertaining the whereabouts of the enemy consequent on the general adoption of smokeless powder. Those principles of mounted infantry, which I had the honour to advocate in 1886 in this Institution, when the lecturer was present and lent his powerful aid, are now pretty generally acknowledged to be an absolute necessity to the warfare of the present day. Will the right hon. gentleman allow me to take exception to one remark towards the end of his paper? He alludes to the changes he advocates as being the primary object of home defence. I cannot for one moment suppose that he means to limit our defence to the defence of our own shores. The defence of England, as England is, can only be achieved by the defence of the British Empire, and by the active protection of British interests. The distinguished lecturer will, I am sure, agree that all changes in the British Army must be such as will admit of its undertaking offensive-defensive operations in any part of the world where the fate of the integrity of the Empire may be imperilled, and not by any means confined to home defence.

Colonel the Right Hon. Sir J. H. A. MACDONALD, K.C.B., in reply, said :—I feel complimented in having the lecture criticised by two such excellent officers and friends as the gentlemen who have spoken. I am very well aware that in a lecture of this kind one must be always appearing to advocate too strongly the points one is stating. It is absolutely necessary to emphasise these points, and I fear in doing that one is supposed to be setting aside other things which are also of relative importance. Colonel Fergusson said I had set up a man of straw to knock him down. I entirely agree with him that the principles on which he and I are at one are accepted by men who know and are willing to carry them out. But there are a large number of people in our Army who, if anything is stated as an accepted principle by those in authority, are not able for a very long time to assimilate it, and that is a process which I wish to stimulate as much as possible with the aid of this Institution. The case which I quoted of the gentleman at Aldershot, who deployed his battalion with markers out on a bank, was an illustration not so much of the fault of the battalion commanding officer, as of the fault of those who had charge of the inspections. Such a thing could never have happened if our system of inspection had been wiser, because a proper system of inspection would have disclosed the folly of what was being done, and the commanding officer would have been rebuked for it, and it would not have happened again. That is one reason why I said I certainly would not mention the regiment if I had known it, because I attribute what I saw to the fault of the system. The speakers will agree with me that, till within the last twenty years, the system was such that men were called upon to prepare themselves, colonel, major, captain, adjutant, down to the lowest drummer-boy, in a way that had no relation whatever to modern war. That ought to be changed, and to a certain extent is being changed. What we want, I think, is authoritative forbidding of the natural tendency to do what we have always done. That tendency is very strong with soldiers, very strong with adjutants and sergeant-majors, because the moment you attempt to do anything more they think it unsteadies the men. There are false and exaggerated views about what steadiness means. "Steadiness" means really the spirit of obedience so inculcated into a man that he obeys just from nature and no longer does what is contrary to discipline, because it has become a second nature to him to obey. It does not matter to him what it is you train him to obedience in. Obedience can be as well inculcated by whistle and signal as by yells, the one being a mode applicable to modern war conditions, and the other not. I think it is common-sense that if you can train a man to obedience in what is useful, it is better than training him in what is not useful when actual war work is to be done. General Hutton gave a very good instance of a man springing up to attention, as a demonstration of good discipline. The Germans carry that out. If a German soldier is suddenly ordered to pump some water into a pail, the first thing he does is to come to "attention," and then he goes to pump the water into the pail. But that is no reason why men should be kept practising at mere externals having no relation to actual soldiering, day after day and week after week, wasting time and wearying and destroying the interest of the soldier in his work. I hope it will be noticed that I said that the first part of the drill ought certainly to be done in a strict, disciplinary manner ; but what requires to be realised is, that this can be, and ought to be, done without perpetual shouting of words of command, which one can hear half-a-mile off, and forcing men into stiff and unnatural attitudes, and obsolete formations. It is a continuation of that, the perpetual wearying round of a barrack-yard, which, I think, wise men are learning to condemn as overdone, and consequently injurious instead of beneficial. I hope it will be believed that I do not disagree with anything said by my two critics. Colonel Fergusson said something about the bellowing out on the field having been abolished in the Rifle Brigade. That is just what I should expect. We know well that the Rifle Brigade has been always ahead of the rest of the infantry. What I want is the rest of the Army to follow. General Hutton said I had not emphasised enough the question of the group being an administrative unit. I emphasised that pretty forcibly the last time I was here. I had not room to put in everything this time, and I was emphasising the necessity of having groups established as a necessary thing in our Service. When they are established they

will become administrative groups. On one occasion I went to the War Office to see a very distinguished officer and spoke to him about the great importance of working together, and what a great thing it would be if the men could be grouped so as to do all their duties together. He said: "That would be a very good thing, but it would not work, because our system of squadding in barracks would not admit of it. When we have two men together in the British Army these two men are never on duty together. Our plan is that one man shall do the duty and the other clean up all the things in the barracks." If that is your system, then good-bye to all your system of attempting to make men work together as comrades. As soldiers they ought to be together day and night: wherever they are, the men that are grouped should be together. I say emphatically: If any system of squadding in barracks prevents that, the system is essentially bad for the training of our Army, and the sooner it is altered the better. I may also express my entire concurrence with General Hutton in his view about our organisation being not merely for home defence, but for offensive purposes. Our Army cannot be efficient or satisfactory unless it is able to do work elsewhere than in the United Kingdom. But I do say this, that it is the duty of every country in considering all its different arrangements for the purposes of war to see that, if there are two modes of doing a thing, both of which are equally good, but one is better adapted to the nature of its own country than the other, the one that is well adapted to the nature of its own country is adopted; and I am sure General Hutton will not differ from me in that. You have been very kind in receiving this lecture; and being of a practical turn of mind, I should like to say this in closing. Lectures have very little effect unless those who listen to them disseminate abroad what has been said. Whatever you are going to do, no matter whether you do it according to anything said in my paper, or by the two gentlemen who have spoken, or in any other lecture delivered here, the important point is that not merely should we have Pall Mall reform—I do not know what is wrong there, but everybody in the newspapers seems to think there is a great deal wrong. I beg of you, disseminate to the utmost of your power the urgency of leaving what is behind, and vigorously pressing forward to what is before. We want to have our whole military machine really taken out and thoroughly inspected, to see whether it requires alteration according to new conditions or requires to be furbished up, and what regulations need to be rejected and what new regulations introduced. I do sincerely trust, now that we have had our first big war for a good many years, we shall not allow the opportunity to pass without doing our utmost to see, when we approach another war, that we shall have the best military machine that can be produced for the purpose of doing what requires to be done when such a misfortune overtakes us. I am most grateful for the kind way in which what I had to say has been received.[1]

[1] I should like to add that in urging that the soldier should at once on joining be made acquainted with his weapon, I did not mean that he should at once be entrusted with it altogether. What I did mean was that from the moment he joins he should have the fact impressed on his mind that it is *for fire—effective fire*—that he is going to be trained, and to help to this that at the very outset he should be taught something about the weapon, made familiar with it, and imbued with the truth that it is he and his weapon together that constitute the soldier that can do useful work in the field.—J. H. A. M.

TO INDIA:
MILITARY, STATISTICAL, AND STRATEGICAL SKETCH.—PLAN OF FUTURE CAMPAIGN.

Translated from the Russian of B. T. LEBEDEV,

By Lieutenant H. C. HOLMAN, 16th Bengal Cavalry.

[For "Introduction, First Campaign and Seizure of Herat," see JOURNALS for November and December, 1899, and January, 1900.]

(Continued from p. 184, February, 1901.)

"The more powerful Russia becomes in Central Asia, the weaker does England become in India, and, consequently, the more amenable in Europe."—*A. Sobolev.*

CHAPTER XVI.

3rd Campaign.—ADVANCE OF THE RUSSIAN ARMIES FROM THE KANDAHAR-KABUL LINE TO THE INDUS.—THE MOST SUITABLE MOMENT FOR THE COMMENCEMENT OF THE CAMPAIGN.—ROADS LEADING FROM THE LINE KABUL-KANDAHAR TO THE INDUS.—ENGLISH PREPARATIONS IN THE THEATRE OF THE CAMPAIGN.

In all probability a certain amount of time will elapse between the second and third campaigns, and of this we shall avail ourselves to prepare for our further advance to the Indus. It is hard to say how much time we shall have at our disposal; possibly it may be but a very small amount, as circumstances may call for an advance to the Indus immediately after our occupation of Kandahar and Kabul, only waiting long enough to construct bases and arrange for provisions for the further campaign. This will be the case if the fortune of war is all on our side, and the rising of the population in rear of the English army has placed them in an untenable position—between two fires. It would be a great blunder not to avail ourselves of this movement; nothing, which might call for any waste of time—guarding our rear, reinforcements—nothing, I say, would be so important as the demands of this moment; and for this moment there must be but one order, the single word "advance."

But if the English quietly retreat without a severe beating to their next line of defence, we must not risk that for which we shall have wasted so much strength and incurred such expenses, and we must carefully prepare for the third campaign. This preparation will consist in making

our position in Afghanistan quite secure, in safeguarding our rear, and in replenishing our armies. The first point is necessary, in order that when we move to the Indus we may be quite sure about the safety of our rear, which we must strive to secure, not only by the force of the bayonet, by fear, but also and mainly by winning the hearts of the Afghans as a result of our clever diplomacy. It goes without saying that the mere friendship of the Afghans cannot entirely guarantee the safety of our rear; we shall have to fortify the most important places in the country, and put garrisons in them. We must also turn great attention to arranging our lines of communications with the rear. Our railways must be carried on to Kandahar, and then, as far as possible, from the Amoo-Daria towards Kabul. Roads must be repaired to make them suitable for wheeled traffic, others must be made, as for example, direct from Herat to Kabul. We shall have to prepare a base on the line Kandahar-Ghazni-Kabul, and collect here considerable amounts of provisions. And then in the further advance towards the Indus, the space occupied by our already vast rear will grow still greater, our lines of communications will get still longer, and consequently we shall have to use more and more forces to guarantee their safety. On our seizing the line Kabul-Kandahar, in all probability in consequence of the near approach of danger, the Indian armed forces will be increased in numbers. MacGregor calculated that in this state of affairs it would be necessary to have an army 300,000 strong, of whom 180,000 must be British troops. It is hard to estimate beforehand what reinforcements should be sent from Russia, for their numbers will be regulated by the forces England can put in the field against us. However, taking into consideration the present state of the armed forces of that country, and calculating that they cannot send more than two army corps to India, or a force of some 90,000 men all told, we can guess that, as we shall see further on, it will be enough to send another five divisions to strengthen our forces in Afghanistan.

By the time of our advance to the Indus, our prestige will be enormous, which will be of the greatest assistance to us. Thus, MacGregor says:—"The Russian army will be simply the point of the lance, which they thrust into the heart of India. But the handle will consist of all the ruffians, from the Caspian to the Indus, whose shoe leather is sufficiently durable to enable them to join in with the Russians."

Before we indicate the operations of the third campaign, let us have a hasty glance at the routes leading from the Kabul-Kandahar line to the Indus, and also let us make ourselves acquainted with the defensive strength of the latter.

On the route of our invasion of India are:-

1. The Suleiman range, which can only be crossed by strong forces, and by means of but few passes.
2. A strip of desert, enclosed by the Suleiman and its southern off-shoots on one side, and by the Indus on the other, called Derajat, east of the Suleiman, but south of it the desert of Kacha-Gondava.
3. The Indus.

Kabul and Kandahar (in particular, Pishin) are the meeting places of all the roads which run from the west to the Indus. Kabul is the junction of the roads, going straight thence, or *viâ* Ghazni, to Peshawar, Thal, Bannu, Tank, and Dera-Ismail-Khan; and Kandahar of the roads to Dera-Ismail-Khan, Dera-Ghazi-Khan, and Jacobabad.

Let us first consider the roads leading from Kabul and Ghazni to the Indus.

From the capital of Afghanistan, along the valley of the Kabul River, and on its right bank, run two roads leading to the plain of Hindustan; the Kabul Valley is divided by the spurs of the Safed-Koh and the mountains of Kafiristan into three enclosed and very fertile valleys, surrounded by hills, viz., the Kabul, Jelalabad, and Peshawar Valleys, communication between which is only possible by mountain passes. On the first of the aforementioned routes, which is the nearest to the Kabul River, are the Lataband and the Jagdalak Passes; and on the second, which passes further south, are Haft Kotal and Karkacha. Both these routes join up at the Khyber Pass, which joins the valleys of Jelalabad and Peshawar; nearly all conquerors have got into India by the Khyber Pass. The Khyber Pass, which consists of a series of narrow defiles, which could easily be blocked, opens on to the plain of Peshawar by Fort Jamrud, 15½ versts from Peshawar. As roundabout roads we may mention:—

1. The road from Dakka to Michni, which entails a two-fold crossing of the Kabul River.
2. Very difficult mountain paths across the Tartar spurs.
3. A road going near the Khyber Pass to the south, and running by the Sasobai Pass across the valley of the Bazar River to Jamrud; this road has long been known, for Nadir Shah, with an army of 100,000 men, went by it.

Besides these roads I have mentioned to avoid the Khyber, there is still an excellent road for wheeled traffic, made by the Ameer from Jelalabad to Asmara, whence it goes by an easy route across the Spina-Suka Pass, Miankal and the Swat River to Malakhand. The roads along the valley of the Kabul River, which are useful for traffic, also represent a series of defiles, exceedingly profitable for their defence by your antagonist (Lord Roberts' memorandum).

South of the Safed-Koh the best known route goes along the Kuram Valley. From the Kabul River it goes along the Lohar Valley to the Hooshi River, and then across the lofty Shaturgardan Pass (10,800 feet), which is absolutely impassable in the four winter months, as it is covered by unbroken snow; from Shaturgardan the road goes between high mountains, and then crossing the spurs of the Safed-Koh by the Sirkan-Kotal and Peiwar-Kotal Passes, drops into the valley of the Kuram River, along which it runs to the English frontier port of Tuli, and leads out into a wild, bare, and sparsely-populated country (Lord Roberts' memorandum). From Shagni you can get to the River Indus, either by the above-mentioned road along the valley of the Kunar River (straight from Ghazni to the Lohar Valley), or by roads which lead into the valleys of the Tochi and Gumal Rivers.

The road to the Tochi Valley crosses the Western Suleiman by the Kotoni and Sarfga Passes, then goes along the Tochi Valley, and across the pass of the same name to Bannu. From the descriptions of the operations in 1895 of Lockhart's 3rd Brigade in the Davar Valley, we get the following information about this road:—From Bannu to the Afghan frontier the Tochi Valley does not present any difficulties for the movement of troops; there is plenty of water, and it is of excellent quality; one frequently has to cross from one bank to the other, but in the cold weather the depth of water is nowhere great, and it can be forded nearly everywhere; the locality is open, and well cultivated. From Bannu to Cheranni plenty of provisions are obtainable, and a good amount of forage. When the English troops reached Cheranni, the English engineers explored the Tochi Valley, with the idea of laying out a road for wheeled traffic and a railroad along it, and this, it appeared, would not be an undertaking presenting many difficulties. This reconnaissance has finally cleared up the importance and the advantages of this route.

The road from Ghazni to Dera-Ismail-Khan runs through the central part of the Suleiman Mountains; following the course of the Gomul River, it crosses the Western Suleiman by the Sargo and Sarbondi Passes, and the Eastern Suleiman by the Guleri (Gumri or Gomul) Pass. This road is one of the chief caravan routes between India and Afghanistan. Running over wild desert land, in places it is very narrow, but want of water and food for cattle on some of the marches makes it of but little use for the passage of troops. Of the roads leading to the Gomul road, we may mention those which lead from Kelat-i-Ghilzai and Kandahar *viâ* Maruf; these roads join in the plot of land called Zarmelan, which is the central link in the region of the Suleiman Mountains.

The route *viâ* Gomul, as regards distance, communications, provisions, and water supply must yield the palm to the route *viâ* Tochi.

A linking route between these two roads is: within the confines of the new scientific boundary from Gomul to Vanu-Cheranni, and beyond this boundary from Bannu *viâ* Shakin and Urgun to Shagtori. Besides this, the English are now contemplating a route from Kuram into the Tochi Valley and Cheranni (Lockhart's reconnaissance). Thus Cheranni will be of great importance as a link between Bannu, Ghazni, and the valleys of the Gomul and the Kuram.

Let us now consider the roads leading to India from the southern junctions of these roads—Kandahar and Pishin. From Kandahar for 100 versts the roads to the passes over the Khodja-Amran Range run over a stony desert, cut up by bare rocks, and open enough to allow several columns to move along simultaneously. Again, you can get to Pishin by one of the four passes over the Khodja-Amran Range. From Pishin roads run to the Gomul Pass, Dera-Ghazi-Khan, and Jacobabad.

Two roads lead to the Gomul Pass: one from Khushdil-Khan leads to the valley of the Kundar River, and so to Zarmelan, and the other to the valley of the Zkhob; as we have no information about the first, let us consider the second.

From Pishin the road leads to the valley of the Zkhob River, a tributary of the Gomul, and thence to Guleri Pass, over which the Gomul caravan route leads to the Punjab. At present the communications along the Zkhob River to the Gomul Pass have been perfected by English engineers ("The Ameer Abdur Rahman," by Stephen Wheeler. London, 1895), and there is an idea of carrying the railway along here.

Of the roads leading from Pishin to Dera-Ghazi-Khan (*a*) the northern route leads from Khushdil-Khan across the pass of the Western Suleiman into the valley of the River Borai, or *viâ* the Sangar gorge in the Eastern Suleiman, where it drops into the valley; (*b*) the southern road goes from Pishin to Hernai, Tal-Chotiali, and emerges by the Takhi-Tarvar gorge to Dera-Ghazi-Khan; this road has now been perfected by the English. The Borai and Chotiali Valleys are considered fairly fertile and well watered (Tizenhausen, "Sketch of the British Empire"), although some historic facts speak of the poverty of the Chotiali Valley in provisions; thus, in 1879, the British troops, returning by this route to India, had to carry with them not only the usual provisions, but even grain for their animals which conveyed the baggage. Again, in 1505, the Emperor Baber laments his cavalry, which perished from hunger in Tal Chotiali. Finally, rather south of this, a road goes from Pishin, firstly to Quetta, then mounts the valley of the Shal River, and then, *viâ* the Bolan Pass, descends into India, by the desert valley of Kachi. The main difficulties of this route commence only when the army of invasion emerges on the plain 240 versts wide, which separates it from the Indus; this plain is either a barren desert, or a foul-smelling bog; there are wells in it every 25 versts, but they are so soon exhausted that it was necessary to break up the Bengal column of the Army of the Indus, when it marched from Shirkarpur to the Bolan in 1839, into eight parties, and the cavalry into half regiments (Indian problems: "Can Russia Invade India?" by Colonel H. B. Hanna, 1895). There is a shorter road to Rajanpur straight from Dadar, at the eastern end of the Bolan; but it was proved by the sad fate of the two divisions of the Kandahar column, which were sent by this route in 1878, that it should not be used.

Besides roads, Pishin is further joined to India by a railway. This railway, which now links the Valley of the Indus with the south-east of Afghanistan, consists of a main line (called the Sinde-Pishin branch of the Government North-west lines), and the loop line to Quetta. The Sinde-Pishin line, 508 versts long, starts from the station of Rook and ends at New Chaman. At the last stations of this line are collected supplies for a continuation of the railway for 150 versts, which shows the intention of the English, at the commencement of military operations, to occupy Kandahar, and unite it by a railway. The Sinde-Pishin Railway from the station of Rook is connected by a railway with the Port of Kurachi, and at the same station it joins on to the other lines of the Punjab.

Besides the afore-mentioned operations, we may also mention a movement from the valley of the Gilmead River to avoid the fortifications of Pishin and to capture Sinde and Port Kurachi. As routes for the operations connected with the first movement, we might use those which

go from the valley of the Gilmead River from Roodbar *viâ* Chagi, or straight from Landi to Hushki, then to Quetta and the Bolan; and as route for the second movement, those leading to Kelat, and, further on, into Hindustan by the Mula Pass *viâ* Bela and Port Kurachi. However, the difficulties which the Baluchistan Desert presents for the movement of considerable masses of troops give these lines of movement the character of merely auxiliary lines.

Let us now consider *the* measures, which the English have already taken to defend the approaches to the Indus. By the drawing up of a new scientific boundary line (frontier), a considerable part of the Eastern Suleiman with its main passes has been made over to England, also all this territory has been surveyed, mapped, and improved, in the sense of laying out roads. There is no doubt that the defence of the approaches to the Indus will be by means of the defence of passss of the Suleiman, the possession of which will give the English the possibility of carrying out this defence actively. Besides getting a favourable position in the mountains, the English have proceeded to build fortifications on the most important places, and to develop a whole network of railways, necessary for the rapid concentration of troops at any threatened spots. Where the Western Suleiman runs into the Eastern, the ranges, which cut into each other, form a perfect labyrinth of mountains, and amidst them are the Quetta and Pishin Valleys.

These valleys are connected with India by a railway, and form the advance "barrack-square" on which the English troops will concentrate for the defence of the North-West Frontier. The English have defended this railway by various fortifications, and have built here a fortified camp, which completely closes not only the roads which lead from Kandahar to India *viâ* the Bolan, and to Kurachi *viâ* Kelat and Sonmiani, but, by its position on the flank of the other roads to the Indus it closes the latter also.

The principal fortifications are at the following places (Yearly Confidential Reports on the Musketry of Anglo-Indian Army, 1889-90 and 1890-91, and Tizenhausen's "Sketch of the British Monarchy"):—

1. Fort New Chaman on the western slope of the Khodja-Amran range, covering the terminal station.
2. Behind the Khodja-Amran range, including the railway, has been built the so-called Said-Hamid fortified camp in the radius of the points Killa-Abdulla Khan-Gulistan-Said-Hamid, near each of which forts and batteries have been thrown up.
3. In rear of the Said-Hamid fortified position has been built the long and broad Quetta position, which reaches on the right from the station of Kach, and on the left to the Gazarband Pass.
4. In rear of the Quetta lines, by Quetta itself, batteries have been thrown up.
5. The fortifications of the Chapar defile, which close the Hernai Railway at its most difficult part, from an engineering point of view.

These fortifications are of a temporary kind, and are regarded as impregnable, except for siege artillery. Over the rest of the theatre of the war for the third campaign there is only a line of fortified posts along the boundary, for the defence of the Punjab against Afghan incursions, Bala-Hissar, the citadel in Peshawar, which has been renovated and mounted with artillery, and the bridge-heads at Attock and Kalabagh.

Besides the afore-mentioned fortifications, doubtless others will, if necessary, be erected. Thus George Curzon thinks it necessary to have, between the Kabul Valley and Pishin, another intermediate centre, and to erect there a strongly fortified camp, or, at all events, a strongly fortified tactical position, to prevent the cutting of the whole strategic line in the centre, or a movement to circumvent *viâ* Pishin and Quetta. Such a central point has already been decided on (according to Sir Charles Dilke), but where it is is unknown. We may, however, guess that it will be near the point of unition of the valleys of the Gomul and the Zkhob, and of the western track to Maroof and Kelah-i-Ghilzi; consequently in the vicinity of the villages of Nussein-Harat, Domandip A'pozai, and, we may add, Bannu.

To assemble troops at the passes of the North-Western Frontier the English have at their disposal three railways in the Punjab, starting from the bases of Lahore and Revind, and connected with the general railway system of the Indian Empire:—

1. *The Northern.*—Lahore-Peshawar-Jamrud, stopping at the mouth of the Khyber Pass; a branch line from it goes to Kushalgarh, and thence runs the shortest route to Kohat.
2. *The Central.*—Branching off from the Northern at Lalla-Musa and running to Kunddan.
3. *The Southern.*—From Lahore, *viâ* Multan and Rori to Karachi.

Besides these lines, there is also a railway along the left bank of the Indus, between Attock and Dera-Ghazi-Khan, which links up the Northern, Central, and Southern lines. This line allows the English to freely move their forces in the valley of the Indus, and to send them across at a selected spot, to move on any of the passes of the Eastern Suleiman. To aid the railways in massing troops roads have been constructed, metalled and unmetalled, leading to all the most important points. Thus, along the right bank of the Indus, from the Peshawar Valley to Jacobabad and Shikarpur, are two parallel roads, the western of which, a cordon road, connects the fortified posts lying at the foot of the Suleiman, and the eastern one runs along the actual bank of the river. For strategical purposes, a military *chaussée* has been made on this bank from the ford at Kushalgarh, *viâ* Kohat and Bannu, to Dera-Ismail-Khan, which allows the movement of troops to the numerous passes in the Suleiman. This *chaussée* has been constructed with the idea that in a very short time a railway might be laid out on it (Tizenhausen).

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out the failings of this net work, the result of which is the slowness of the transport of troops. In confirmation of this, we may mention the calculations of David Ross, an authority on the G.T.P. He, as we have already said, calculates that it is possible to start off 12 trains daily along this line, which could convey 2,100 men with transport and artillery. Under these conditions the number of troops which can be concentrated at one point wavers between 2,160, 4,320, and 6,480 men every 24 hours, and will depend on the number of lines which can be made use of, running from the point of embarkation to that of debarkation of the troops. These figures do not speak much in favour of the quickness of the transport of troops for a concentration.

CHAPTER XVII.

Plan of the Defence of the Approaches to the Indus, as Proposed by MacGregor.

MacGregor, who drew up the plan for the defence of India—which plan, in its main points, has already been carried out by the English—proposes to defend the approaches to the Indus mainly by operations against our sensitive lines of communications. The sensitiveness of the latter is indeed great; besides the great length of our communications in the campaign we are analysing, in consequence of the poverty, and the laying waste by the enemy, of the country, we shall have to bring up everything necessary for the existence of the army from the base.

For the execution of his plan of defence, MacGregor considers it necessary to have an army of 300,000 men, and also, of the composition of the fighting men, whom he calculates at 240,000, he says five-eighths must be English troops. In addition to this he demands the expansion of the railway line on the right bank of the Indus to the maximum, and that all the most important places in the theatre of war must be linked up by this line.

The most favourable line of advance for us, MacGregor considers, as it is protected on the right flank, is the line from Kabul, Lahore, and Ghazni along the roads leading to that part of the Indus Valley between Attock and Dera-Ismail-Khan. It is recommended to move along all the roads in order to scatter the English troops, but the main Russian force would move by the Peshawar and Gomul roads. On approaching the Indus Valley, it is recommended to concentrate the troops towards the flanks by means of intermediate roads, and then, without any loss of time, we should set about seizing the crossings at Attock and Dera-Ismail-Khan. After seizing them, our left flank will commence a forward movement, whilst the right will mark time a little till we have taken Rawal Pindi; after this the right flank will also move forward, threatening the English communications with Lahore, and then both flanks will move towards the latter place.

To act against the Russian advance towards the Indus, MacGregor proposes to occupy three lines of positions :—

1. Jelalabad-Kuran-Matun-Zarmelan, Zoba, Bori, Quetta, and Kelat; in each of these positions he proposes having a strong citadel, armed with heavy guns, and capable of containing 3,000 men, forming the centre of a fortified camp for 50,000 men.
2. Peshawar, Thal, Kohat, Bannu, Gomul, Vigova, Mangrotta, Vidor, Garand, Jacobabad, along the foot of the Eastern Suleiman, for the struggle for the exits from the mountains.
3. Torbela, Attock, Kushalgarh, Tsakhel, Dera-Ismail-Khan, Dera - Futteh - Khan, Daeradin - Pana, Dera - Ghazi - Khan, Chachur, Kazmore, and Rori, along the Indus, to secure the retreat of the troops, or to blow up the bridges.

Before going on to define the character of the defence, MacGregor makes the following suppositions: the Russians will either attack with both flanks, making a feigned attack on the centre, or will attack with their centre and right flank, with a false attack of their left wing; or, finally, will move on their centre and left wing, making a feigned attack with the right wing.

Till things clear up, the 240,000 field army must be distributed as follows: in Jelalabad, 30,000; in Gomul, 30,000; in Pishin, 30,000; in Rawal Pindi, 50,000; in Lahore, 50,000; and in Multan, 50,000.

MacGregor calculates the Russian strength for the advance on the Indus, from Kandahar, Ghazni, and Kabul, at 190,000 men, or 120,000 in Kandahar, and 70,000 in Kabul and Ghazni.

Then, when it is clear that the Russians are adopting the first of his suppositions, against their left flank will be moved 90,000 men, against the right flank 120,000, and 40,000 against the centre, to prevent the feigned attack being converted into a real, serious one.

The whole defence on the line Kabul-Peshawar is to be a war of positions, this is in holding out in a series of previously fortified positions, with a simultaneous movement against the flank of the invaders. To operate against the Russian right flank, the English will have at their disposal the following forces: 30,000 at Zarmelan, strengthened by another 30,000 from Lahore, and 30,000 at Quetta; 20,000 will move from Lahore to Bannu, and 30,000 from Multan to Dera-Ghazi-Khan; and another 20,000 will remain in reserve at Multan. Thus, in the advance in the direction of Pishin-Sukkur, he will be met, first of all, by 30,000 men at Pishin, whilst 60,000 will be moving against his left flank; moving on Mangrotta, he will meet 30,000 troops moving up from that place, and will have on one of his flanks 60,000 in Zarmelan, and, on the other, 30,000 from Pishin against him. If, however, our right flank moves *viâ* Zkhob, it will have in front of it 60,000 men, and 60,000 men against its right flank, also; these forces may be, in a few days, increased to 80,000 by reinforcements from Multan; but if the Russians move direct from Kandahar *viâ* Ra-i-Maruf on the Gomul, the forces at Zarmelan,

detaching 10,000 to guard the approaches from Zkhob to Derajat *viâ* the Draban Pass, after a possibly prolonged defence of Zarmelan, will move on Kotkai; but the Pishin and Mangrotta corps will act against the Russian lines of communications, and either of them can be reinforced by 20,000 men from Multan.

MacGregor calculates that under the above-mentioned conditions the Russians cannot successfully advance. Another plan for our advance would be an attempt on our part to break through the defensive line of the English, moving along the roads from Ghazni. With this aim in view, it is calculated that our side could only move 140,000 men, as we should have to leave a considerable force in Kabul, and other smaller forces to make demonstrations along other roads.

The grouping of the English forces to meet this supposition will be as follows: The 30,000 men at Jelalabad will be made up to 50,000 from Rawal Pindi; one division of the Pishin corps will move to cut the enemy's communications at Khilab-i-Gilzar; a corps of 60,000 men will be moved to Bannu, and the Zarmelan corps will be increased up to 60,000; besides that, 40,000 men will be held in readiness to reinforce any of the above-mentioned forces. Thus the enemy will meet on its way from 60,000 to 100,000 men; on his flank, in the direction of Zarmelan, will be 60,000 men; and the Russian lines of communications will be completely cut. Then MacGregor supposes that we drive the English back to the confines of their actual frontier; the position of the English under this supposition he compares with the condition of a man who has just been through a deadly sickness, with serious perturbations in his organism, who is suddenly called on to oppose another man in the full bloom of his health.

Against the second line of defence of the English, defending the exits from the mountains, the Russians will move an army 100,000 strong from Kabul, and another army of the same strength from the Lahore Valley and from Ghazni; at the same time a Russian division, 15,000 strong, will move from Chitral across Dir, and, strengthened by the Yusufzais, will move, *viâ* Buner, to the Indus; then, moving across the mountains, it will move down to Hassan-Abdul, and will attempt to cut the lines of communications of the English column from Peshawar; another division, in union with all the troops of the Rajah of Kashmir, will move, *viâ* Kashmir, to Salkot or Gujerat, and will threaten the communications between the English armies and Lahore.

In order to oppose the advance of the Russians with a certain amount of hope for success, MacGregor calculates that it is absolutely necessary to have an army at least 350,000 strong, of whom, taking into consideration the exceedingly doubtful temperament of the native troops, two-thirds must be English troops. He proposes to divide up these troops in the following manner:—100,000 at Multan, 100,000 at Dera-Ismail-Khan, and 100,000 at Rawal Pindi and Peshawar; he tells off a force 20,000 strong to operate against the Russian column from Dir; and a division, 10,000 strong, will threaten the Kashmir column from the Baramul Pass.

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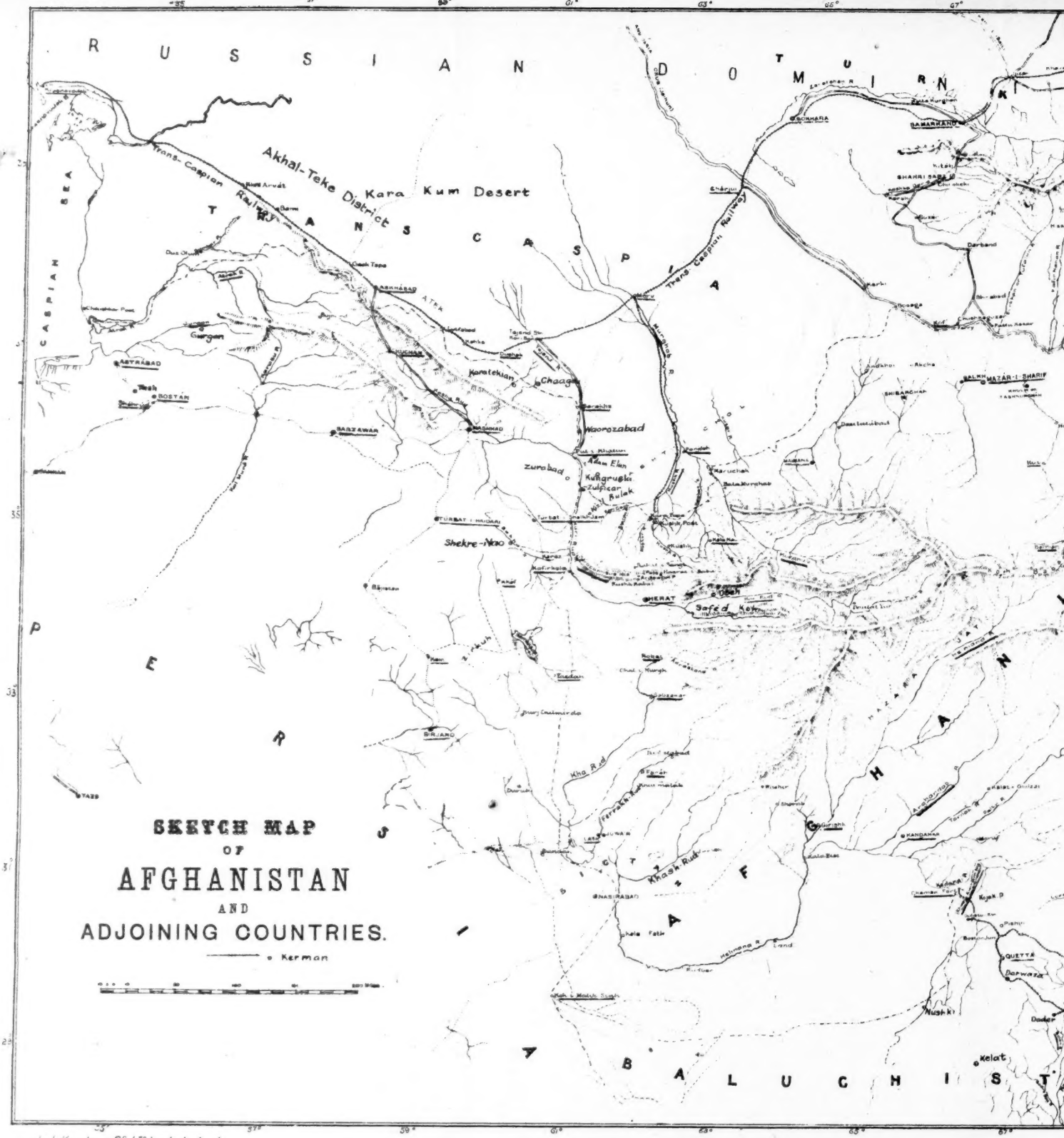

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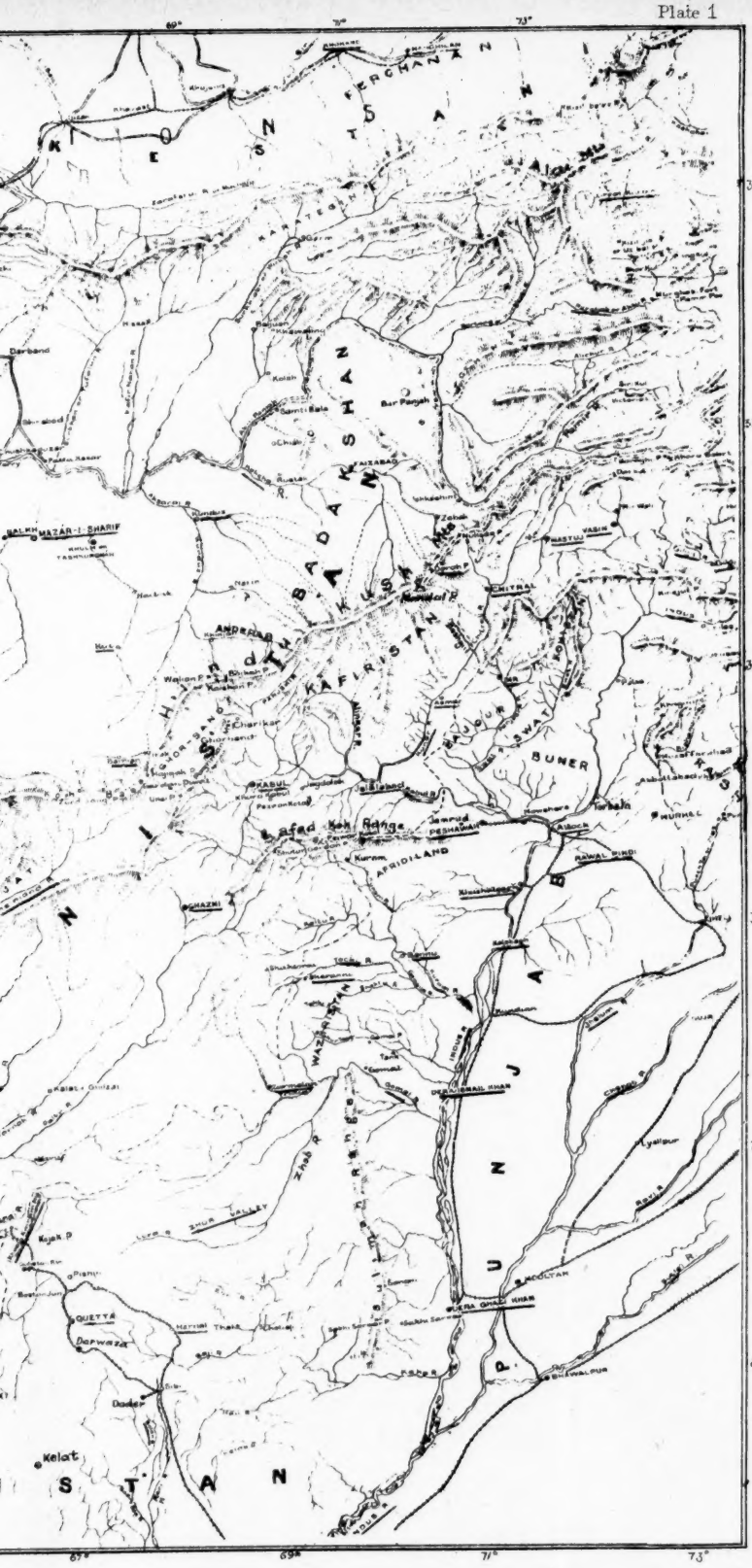
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Rawal Pindi
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Indus R.
Dera Ismail Khan
Multan
Lyallpur
Montgomery
Jhelum R.
Sutlej R.
Bahawalpur
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Mazar-i-Sharif
Khulm
Tashkurgan
Kunduz R.
Andijan R.
Naryn R.
Karategin R.
Gorm R.
Surkhab R.
Kokcha R.
Amu Darya
Oxus R.

The general plan for the defence at this period will be as follows: 120,000 English must hinder the Russian advance from Kabul to the Peshawar Valley, and the rest of the forces must be so disposed as to close the Kuram, Dakar, and Gomul Passes, and also, moving from the centre, fall on the enemy's flank, beat him column by column, and give him a complete defeat.

Then MacGregor says that if the Russians successfully advance to the Indus Valley, the English must be very careful not to allow the enemy to get in rear of them, seize the river-crossings, and thus cut off their line of retreat; stubborn battles will take place to cover the retreat of the English troops to the crossings of the Indus, and then all the bridges across the latter will be blown up.

Having thus become acquainted with MacGregor's plan, and not stopping to criticise it, we may come to the conclusion that it can be carried out only, firstly, with a largely developed railway system, which would render it possible to move large forces quickly over a considerable distance; and, secondly, in the absence of any hostility from the native population of the country; but if these postulates are wanting, the execution of the plan would simply lead to the forces in hand being too widely scattered.

Again, MacGregor demands for the defence of the approaches to the Indus, at first, an army of 300,000, and then of 350,000 strong, and puts it as a condition that the greater part of it must consist of English troops. Under the present *régime* of the English Army, it could not raise the strength to the above-mentioned figures, and England would infallibly have to bring in universal conscription; but, recognising the character of the English, it is very difficult to calculate on this. And so, at the present moment, the principal elements for the execution of MacGregor's plan are wanting. In the ensuing chapter we will sketch out in general lines the plan for the movement of our armies on the Indus—a plan which more closely coincides with the present condition of things in general.

(*To be continued.*)

INFORMATION RELATING TO THE CHINESE EMPIRE.

From the Russian of Lieutenant Z. MATUSOVSKI.[1]

Translated by Lieut.-Colonel W. E. Gowan, Retired List, Bengal.

Names by which the Chinese Empire is Known amongst the Nations of Europe.

THE vast Empire, which occupies the whole of the south-eastern portion of the Continent of Asia, is known to us, Russians, as Kitai; whereas the French call it Chine, the English China, and the Germans Khina or Hina, and so on. But all these designations are perfectly unknown to the Chinese themselves, who, from the very earliest times, took to calling their sovereignty by the name of the ruling dynasty of the particular time, so that, as each dynasty gave place to another, the name, by which the country was known, likewise changed. Thus, at the present time, China, in all official relations, is called by the name of the ruling house, viz., Dai-Tsin;[2] but, prior to the coming to the throne of the Manchurian dynasty, it was known under the name of Dai-Min, and so on. In addition, however, to any such general name, the country possesses certain permanent designations, which are generally employed in literature and in the language of conversation, such as Tian-Siya (Celestial), Choon-Ho (the Middle Sovereignty), Choon-Hooa (the Central Garden), Choon-Yuan (the Central Plateau), and many other similar designations.

As regards the names, which foreigners have adopted when speaking of the Chinese Empire as a whole, their origin is explained by certain historical *data*. Thus, for example, the name Kitai was taken from that of the Kidan dynasty, whose territory, in the tenth and eleventh centuries A.D., consisted of Manchuria and of the northern portions of the provinces of Chi-Li and Shan-Si.[3] This sovereignty, which was then known under

[1] St. Petersburg, 1888. Pp. i. to xx., and pp. 1 to 358; also five appendices on pp. 01 to 087. With map on four sheets. *A Geographical Sketch of the Chinese Empire*, by Lieutenant Z. Matusovski.

[2] Kuang-Hsu is now the titular Emperor of China.—Translator.

[3] This was the dynasty of Liao, which reigned from 907 to 1127 A.D. After its fall, one of the Kidan princes fled in a westerly direction and took up his abode on the Choo River, where he founded a powerful sovereignty in the country which is now known as Russian Turkistan. Muhammadan writers speak of this sovereignty under the name of Kara-Kitai. Into this sovereignty there entered, amongst other places, the town of Samarkand, but in the year 1218 A.D. the same sovereignty was conquered by Chingiz-Khan. (Note by Dr. Bretschneider.)

the name of Kidan, was subsequently broken up by the Tszin-Tsams,[1] and although the latter were in their turn driven out by Chingiz-Khan, yet the name of the country, over which the Kidans had ruled and which comprised a portion of the present Chinese Empire, was preserved amongst the neighbouring peoples, to wit, the Mongols and the Eastern Turks or the Tatars; and from these peoples the name of Kitai passed to the Russians.[2] As regards the origin of the names Chine and China, and all other similar designations, there exists no trustworthy information. Some sinologues, however, trace them to the name of the Tszin dynasty from 255 to 206 B.C., whilst others think that the names in question proceed from that of the Khan dynasty (which reigned from 206 B.C. to 220 A.D.). It is, however, known that the great Hindu law-giver, Manu, who lived, as some suppose, at about 1000 B.C., called China "Maha-Kitai," or "Great China," but all such suppositions have no real foundation.[3] This much only is known, with certainty, that the various names which are used by Europeans, when speaking of the Chinese Empire, were borrowed by them either from natives of India, or from the Arabs or the Egyptians.

In a popular sense, the Chinese call themselves Choon-Ho-Jen[4] or Han-Jen, *i.e.*, the "people" of the Han dynasty, but the first of these designations, Choon-Ho, is, for the most part, employed in literature. In ancient times, when the Chinese frontiers did not extend to the south of the River Yan-Tszi-Tszian, the Chinese called Man-Tszi or "southern barbarians" those of their neighbours who lived to the south of them. The Mongols too during the period of their dominion over China also applied the name Man-Tszi to the inhabitants of Southern China, but the name Han-Jen they gave to the Chinaised Koreans, Kidans, and Jurjis, and when their dominion over China was overthrown the Mongols began to class as Man-Tszi those Chinese who lived beyond the limits of their own country, *i.e.*, those who dwelt in Manchuria and Mongolia. For the same reason, those Chinese who now live in the Ussuri country bear the name of Man-Tszi.[5] The Manchus, however, call the Chinese *Nikan*.

The Ruling House of China.

The present ruling house of China, which is of the dynasty of Dai Tsin, is better known to Europeans by the name Manchu, since its

[1] The dynasty of the Tszin or Hin, or Nui-Chen, or, as Muhammadan authors called it, Jurji, ruled from 1125 to 1234 A.D.

[2] Richthofen's China Book I., p. 594.

[3] It is remarkable that when, at the close of the first century A.D., Chinese envoys reached the Mediterranean Sea, and learnt the existence of a powerful Roman Empire, they called it Dai-Tsin, the very name of their own ruling dynasty. Chroniclers, however, of that time explain this fact by saying that the power of the Roman Empire was at that time felt as far as the limits of the Chinese sovereignty. (Note by Dr. Bretschneider.)

[4] Jen signifies "man" or "person."

[5] See Father Palladius on the Man-Tszi of the Ussuri tract in the *Intelligence* of the I.R.G. Society, No. 8 of 1871, p. 170.

founder, Tai-Tszoon, was ruler of Manchuria and he, after conquering Northern China, ascended the throne of the entire Chinese Empire in the year 1644 A.D. After gradually overrunning the whole of the "Middle Kingdom," the Manchus adopted the manners and customs, language and mode of life of the conquered race, whilst their own country fell to the status of a mere outlying province of the Chinese Empire. And yet, in spite of their own numerical inferiority, as compared with the great mass of the purely Chinese population, these very Manchus are now the "predominant partner" in China, for they fill the highest offices in the State, both in the Civil Administration and in the Army.

The Emperor of China, whose name is Da-Huan-Di,[1] we Russians more often call the Bogdo-Khan, and we have borrowed this title from the Mongols. The Chinese style their own Emperor Tian-Tszi (the son of Heaven), but in personal addresses they magnify this title into Huan-Shan, which corresponds with the expression "Your Majesty" or else they employ the title Choo-Tszi (Sire or Master). According to Chinese custom, no subject has the right, during the Emperor's life-time, to pronounce the proper name of the Bogdo-Khan. Hence it is that in Chinese official, as also in private, correspondence, Chinese Emperors are called after the first year of their reign. Thus the Chinese, when speaking of the present Emperor,[1] who ascended the throne in 1875, allude to him as Huan-Sooi.

The Chinese State seal is represented by a dragon with four paws, bearing five claws on each. The Imperial colour is yellow.

CHINESE RULING DYNASTIES.

(Compiled by our famous sinologue, Dr. Bretschneider.)

A.—The Legendary Period from 2852 to 1122 B.C.

Period of the five sovereigns (Voo-Di) from 2852 to 2205 B.C.

The five famous sovereigns of this period were :—

Foo-Si,	who reigned	from	2852	to 2737	B.C.
Shen-Noon	,,	,,	2737	,, 2697	B.C.
Huan-Di	,,	,,	2697	,, 2597	B.C.
Shao-Hao	,,	,,	2597	,, 2513	B.C.
Chooan-Sooi	,,	,,	2513	,, 2435	B.C.

* * * * * *

It is supposed that what is now the Chinese sovereignty was founded in the southern portion of the present province of Shan-Si, and that thence it gradually extended, but more towards the north, west, and east than towards the south.

The dynasty of Siya reigned from 2205 to 1766 B.C.

The dynasty of Shan, and subsequently that of In, reigned from 1766 to 1122 B.C.

During the reign of these dynasties the Chinese dominions did not extend south of the river Yan-Tszi-Tszian.

[1] See note *ante* under Kuang Hsu.—TRANSLATOR.

B.—The Historical Period.

European *savants* reckon the commencement of the historical period in China to have begun with the year 776 B.C. (the Chinese put it down much earlier than this), because in the Shi-Tszin (one of the ancient classical books of China), under the head of this year (776 B.C.) are indicated the month, the day, and the hour in which there occurred a total eclipse of the sun. Now, according to the calculations of European astronomers, it is shown that the above indication is correct.

Dynasty of Choi, which reigned from 1122 to 255 B.C.

During this dynasty the centre of Chinese civilisation was in the southern part of the present province of Shen-Si on the River Vei. Here the Chinese sovereigns established their capitals. One of these—the Western—was in the town of Hao-Tszin (in the neighbourhood of the modern town of Si-An-Foo, in the province of Shen-Si); the other, or the Eastern capital, was at Lo-Yan (close to the modern town of He-Nan-Foo, in the province of He-Nan, to the south of the Yellow River). The Chinese dominions had, at this period, already passed a little to the south of the River Yan-Tszi-Tszian.

Dynasty of Tsin, which reigned from 255 to 206 B.C.

The famous Emperor Shi-Hooan-Di (famous as the constructor of the Great Wall of China), who reigned from 221 to 209 B.C., was the first to establish one vast sovereignty over China. He conquered Southern China, *i.e.*, the modern provinces of Foo-Tszian, Hooan-Doon, and Hooan-Si, and the Chinese sovereignty of his day occupied almost the same area that it now does. The south-western portion of China alone, viz., the present province of Yun-Nan and a part of the province of Hui-Choi, still remained in the possession of the "barbarians," but, during the reign of the succeeding dynasty these were also annexed to the Chinese dominions.

The capital of the Emperor Shi-Hooan-Di was at Sian-Yan (in the neighbourhood of the modern town of Si-An-Foo, in the province of Shen-Si).

Dynasty of Han, which reigned from 206 B.C. to 220 A.D.

The Han dynasty has a two-fold classification:—

1. That of Tsian-Han, or the elder house of Han, which reigned from 206 B.C. to 25 A.D. The capital of this elder house was at Chan-An (close to the modern town of Si-An-Foo).
2. That of Hoi-Han, or the junior house of Han, also under the name of Doon-Han, *i.e.*, Eastern Han, because during this reign the capital of the house was transferred to Lo-Yan (see above). This house of Han reigned from 25 to 220 A.D.

After the collapse of the Han dynasty, China was split up into three separate sovereignties. This short period the Chinese called San-Ho or "The Reign of the Three Kingdoms," viz.:—

1. The reign of Shoo-Han, or that branch of the Han dynasty which reigned from 221 to 263 A.D. over Shoo (now the province of Si-Chooan). Their capital was the town of Chen-Doo-Foo.
2. The reign of Vei or that branch of the Han dynasty, which reigned from 221 to 265 A.D. over Northern China as far as the river Yan-Tszi-Tszian. The capital was at Lo-Yan (see above).
3. The reign of Voo, or that branch of the Han dynasty, which reigned from 221 to 265 over the south-eastern part of China, to the south of the River Yan-Tszi-Tszian. Their capital was at Tszian-Ye, or Tszian-Kan (the modern Nankin).

Dynasty of Tszin, which reigned from 265 to 420 A.D., and which, in the first year of its reign, set up one united sovereignty over China. The capital of this dynasty was first of all at Lo-Yan (see above), from which it was transferred to Tszian-Kan (the modern Nankin).

In the beginning of the fourth century A.D., the Tszin dynasty was driven out of Northern China by Tatar tribes who there founded the dynasty of Bei-Vei ("Northern" Vei), which reigned from 386 to 558 A.D. The limits of the Vei sovereignty embraced the whole of Northern China as far as the River Yan-Tszi-Tszian. The capital of this dynasty was, firstly, at Dai (the modern Da-Toon-Foo in the province of Shan-Si), and thence the capital was transferred, in the year 495 A.D., to Lo-Yan (see above).

Following the Vei dynasty two other Tatar dynasties established themselves over Northern China, viz., the Bei-Tsi (or "Northern" Tsi) dynasty, which reigned from 550 to 577 A.D., and the Bei-Choi (or "Northern" Choi) dynasty, which reigned from 557 to 581 A.D.

The Chinese call these three Tatar dynasties Bei-Chao (or "the Northern dynasty"), whilst they give the name Nan-Chao (or "Southern dynasties") to the four following dynasties of the same period. These dynasties reigned over Southern China, *i.e.*, the south of the Yan-Tszi-Tszian one after the other during the fifth and sixth centuries A.D. :—

1. The dynasty of Soon or Loo-Soon, which drove the Tszin dynasty out of Southern China, and which reigned there from 420 to 479 A.D. Their capital was at Tszian-Kan (the modern Nankin).
2. The Nan-Tsi (or Southern Tsi) dynasty, which reigned from 479 to 502 A.D.
3. The Lian dynasty, which reigned from 502 to 557 A.D.
4. The Chen dynasty, which reigned from 557 to 589 A.D.

During the dynasty of Sooi, which reigned from 589 to 618 A.D., a united Chinese sovereignty was once more established. This dynasty, and those that followed it, therefore ruled over the whole of China. The capital of the Sooi dynasty was, firstly, at Chan-An, and subsequently at Lo-Yan (see above).

The dynasty of Tan, which reigned from 618 to 907 A.D. The capital of this dynasty was at Chan-An (see above).

After the Tan dynasty there followed a period, which the Chinese call Voo-Dai (or the five lesser dynasties).

These were :—

1. The dynasty of Hoi-Lian (or "the Lesser Lian") from 907 to 923 A.D.
2. The dynasty of Hoi-Tan (or "the Lesser Tan") from 923 to 936 A.D.
3. The dynasty of Hoi-Tszin (or "the Lesser Tszin") from 936 to 947 A.D.
4. The dynasty of Hoi-Han (or the "Lesser Han" (from 947 to 951 A.D.
5. The dynasty of the Hoi-Choi (or "the Lesser Choi") from 951 to 960 A.D.

The dynasty of Soon, which reigned from 960 to 1280 A.D., at first ruled over the whole of China, with the exception of the northern portion, of what are now the provinces of Chi-Li and Shan-Si, which, from the year 936 A.D., had been occupied by the Kidans. Subsequently, the Tszins (see below) wrested from the Soon dynasty the whole of Northern China. The capital of the Soon dynasty was, firstly, at Da-Lian (the modern Kai-Fin-Foo, in the province of He-Nan); thence it was transferred to Lin-An (the modern town of Han-Choi-Foo, in the province of Che-Tszian).

The Tatar dynasty of Liao, as also that of Ki-Dan, ruled in Manchuria and in the northern parts of the provinces of Chi-Li and Shan-Si, from 916 to 1125 A.D. These dynasties had five capitals: in Manchuria, in Southern Mongolia, and in China proper. One of these capitals was at Yan-Tszin (the modern Pekin).

The Tatar dynasty of Tszin or Hin, as also that of Nooi-Chen, or, as Muhammadan writers call them, Jurji. These dynasties, having overthrown the Liao dynasty, possessed themselves of the whole of Manchuria, of Southern Mongolia, and of Northern China as far as the River Hooai. The Tatar dynasty of Tszin or Hin reigned from 1125 to 1234 A.D., when it was driven out by the Mongols. Like the dynasty of Liao, the Tszin or Hin dynasty possessed five capitals, of which one was on the site of the modern town of Pekin.

The Mongol dynasty of Yooan, which claimed descent from Chingiz-Khan, reigned from 1206 to 1368 A.D. The fifth Khan of this dynasty, Khubilai by name, transferred his capital, in 1264 A.D., to Khan-Balik (modern Pekin). The conquest of the whole of China by the Mongols was accomplished in the year 1280 A.D.

The dynasty of Min, which reigned from 1368 to 1644 A.D. This dynasty at first set up its capital at Nankin, in the province of Tszian-Su, but transferred it, in the year 1419 A.D., to Pekin.

The Manchu dynasty of Tsin established itself on the throne of China in the year 1644 A.D., and the same dynasty still furnishes successors to the throne of that Empire.

The names of the sovereigns of this dynasty are as follows:—

Shoon-Chi	who	reigned	from	1644	to	1661 A.D.
Kan-Si	,,	,,	,,	1661	,,	1722 A.D.
Yoon-Chen	,,	,,	,,	1722	,,	1736 A.D.
Tsian-Loon	,,	,,	,,	1736	,,	1796 A.D.
Tszia-Tsin	,,	,,	,,	1796	,,	1820 A.D.
Dao-Hooan	,,	,,	,,	1820	,,	1850 A.D.
Siyan-Fin	,,	,,	,,	1850	,,	1861 A.D.
Toon-Chi	,,	,,	,,	1861	,,	1875 A.D.

Hooan-Sooi, who ascended the throne in 1875.[1]

Composition of the Chinese Empire.

The Chinese Empire, which occupies the south-eastern portion of the Continent of Asia, is bounded on the east and south-east by the Great Ocean, the coast-line of which is indented by the following bays and gulfs:—Liao-Doon, Korea, and Chi-Li; the Yellow Sea, which is also known as "the Eastern China Sea"; the South China Sea and the Gulf of Tonkin. Towards the south, the frontiers of China run conterminous with Tonkin and with Burmah, whilst, further on, they touch the Himalayan range, which separates the independent States of Assam,[2] Bhutan, Sikhim, Nipal, and Ladak from Chinese Tibet. In another direction, too, the Chinese frontiers approach those of Hindustan, viz., in the direction of those small semi-independent States which are generally known under the collective designation of "Yaghistan." Thence they pass northwards through the natural boundary of Lake Sari-Kul, which separates Kashgaria from the Pamirs. Beginning at the mountain pass of Uz-Bel, which lies to the south of Lake Kara-Kul, the Chinese Empire covers the vast area which is measured by nearly 60° longitude, for it extends in an easterly direction as far as the mouth of the River Tumen-Ula, which falls into the Sea of Japan, and during the whole of this vast extent the Chinese and Russian dominions run conterminously.[3]

The Chinese Empire is made up of vast and varied countries of which some have nothing in common in respect either of nature or population. The area of the entire Chinese Empire covers 200,910[4] square miles[5] or an extent of territory exceeding the whole of Europe by

[1] See note *ante* under Kuang-Hsu.—TRANSLATOR.

[2] Assam is not an "independent" State, but is an integral portion of British territory and is ruled over by a Chief Commissioner.—TRANSLATOR.

[3] For a detailed account of the Russo-Chinese frontier-line, see the appendices to this work, in which will be found also the text of the articles in the treaties defining them.

[4] These are the figures in the Russian text, but they are obviously wrong, seeing that if the area of Europe, which is something like 3,900,000 square miles, is exceeded by that of the "entire Chinese Empire" by 23,069 square miles, the area of the latter would amount to close upon 4,000,000 square miles.—TRANSLATOR.

[5] According to the reckoning of F. A. Straiilbitski.

23,069 square miles. Then, again, Inner China, which though it comprises eighteen provinces, and has an area of but 0·36 of the entire surface of the Chinese Empire, yet, as regards density of population, it ranks first, constituting 95·9 per cent. of the population of the entire Chinese Empire.

Exterior China consists of Manchuria and Mongolia and of territory formerly known as the Khanate of Chungaria, of Eastern or Chinese Turkistan and of Tibet. Besides these provinces, the kingdom of Korea is nominally considered to be a dependency of the Celestial Empire.

The whole of this vast expanse of territory has, at different times, entered into the composition of the "Middle Sovereignty." Thus, Northern Mongolia (Khalkha) was annexed to the Chinese Empire in the year 1690.[1] Inner Mongolia, too, was comprised within the limits of the Dai-Tsin monarchy at various periods, beginning with the restoration of the Manchu dynasty and ending, approximately with the 60th year of the seventeenth century.[2] Chungaria and Turkistan also were conquered by the Emperor Tsian-Loon in 1757-58. Tibet too, according to Père Hyacinth, came under the protectorate of China in 1642 A.D.[3] and this country is still ruled as an independent State by representatives of its own spiritual and secular head, the Dalai-Lama, acting under the control of a Chinese Resident. Korea also has, from ancient times, been nominally held to be a dependency of the "Middle Kingdom." The Island of Formosa (Tai-Van) entered into the composition of the Chinese Empire during the reign of the Emperor Kan-Si, *i.e.*, between 1683 and 1687 A.D.[4] and the inhabitants of the Loo-Choo or Loo-Tsoo islands have considered themselves vassals of the Bogdo-Khan since the fourteenth century, although they were at that period paying taxes to the Japanese, and consequently the Japanese of this day lay claim to the possession of the islands in question.

Then, again, the colony of Macao, although it is held to be Chinese territory, belongs *de facto* to Portugal, because it passed to that Power like the Island of Hong-Kong which was ceded to England by the Nankin treaty of 1842.

From the foregoing it is apparent then that the Chinese Empire, as at present composed, is made up of a vast stretch of territory which has, for the most part, been acquired since the period of the restoration of the Manchu dynasty. Of the Sovereigns of this house the following Emperors have been especially renowned for their conquests and for their

[1] *Vide* Pozdnaiyeff's *Mongolian Chronicle of Erdeniin Erikhe*, published in 1883. Pp. 220-223.

[2] *Ibid.*

[3] Father Ilarion places this event in the year 1646 A.D., when Khushi-Khan, Prince of Koshut, who ruled over Kuku-Nor and a portion of Tibet, decided to place himself under the protectorate of China, like the Dalai-Lama who did so in 1642 A.D. (See "Account of the Operations of the Members of the Russian Spiritual Mission to Pekin," Vol. II., p. 456, published in 1853.)

[4] Pozdnaiyeff's "Materials for a History of Khalkha," p. 214, edition of 1883.

wise and enlightened system of Government, Kan-Si (who reigned from 1661 to 1722 A.D.) and Tsian-Loon (who reigned from 1736 to 1796 A.D.), for during the reign of these two Emperors China reached a high point in her greatness. During the present century, however, the importance of China in Asia has considerably fallen. The frequent insurrections and disorders which have, from time to time, broken out in the heart of the country and which have been directed against the Manchu Government, as also the progressive advance of civilised people, like the Russians and the English, into the depths of the Continent of Asia, could not but shake the stability of the power which the Celestial Empire once enjoyed amongst the races of Asia. The weakness too of the Bogdo-Khan's Government was especially laid bare in the beginning of the year 1840, when the political and mercantile interests of Europeans in China compelled them to take an active part in the restoration of order throughout the country and in the maintenance of the Manchu dynasty on the Chinese throne. Thus the Tai-Pin[1] rebellion, which had dragged on for more than fourteen years and which had embraced the whole of South-Eastern China, could only be suppressed with the aid of Europeans and their armaments. Again, the insurrectionary movement, which had simultaneously broken out in other parts of China, especially in the province of Chi-Li and in Manchuria, was suppressed only through the moral influence of Europeans. Finally the Muhammadan insurrection, which had begun, in 1855, in the province of Yun-Nan and which had spread over the whole of the north-western portion of the Chinese Empire including Chungaria and Turkistan, wherein, at one time, the Chinese lost almost the whole of their possessions to the west of the Tszia-Yui-Huan gates[2] of the Great Wall, ended favourably for the Manchu Government only thanks to the peaceful policy pursued by the Russian Government. In spite, indeed, of the losses occasioned by the disorders of which we have spoken, disorders which dragged on for fifteen years along almost the entire length of our joint frontier with China, we, Russians, have patiently and persistently striven to introduce into the adjacent provinces of the "Middle Kingdom," torn with disorder, the peace and quiet which are so necessary for the prosperity of Russian trade with the Chinese Empire.

[1] The words Tai-Pin in Chinese signify "great quiet." This was the title selected for the proposed dynasty by the leader of the insurrectionary movement in South-Eastern China when he occupied the town of Nankin in 1856. The insurgents were, however, better known throughout China under the name of Chan-Mao-Tszi or "the long-haired people."

[2] These gates or barriers are at the western extremity of the Great Wall.

(*To be continued.*)

AMERICAN OPERATIONS IN THE PHILIPPINES.

Compiled from Published Reports.

Outbreak of the Rebellion.—After the conclusion of the peace with Spain, the peaceable attitude of the American forces was misconstrued by the Tagalogs into an indication of weakness and fear of a conflict. On the night of 4th February, 1899, they attacked the American troops in Manila, but after several days' fighting were repulsed. On 22nd February there was a concerted rising of the 200,000 Tagalogs in the city, which was promptly suppressed.

At the time General Otis had under his command :—

—	Officers.	Men.
Regulars	171	5,201
Volunteers	667	14,831
Total	838	20,032

All the Volunteers and 1,650 men of the Regulars were, or were about to become, entitled to their discharge. The total force General Otis could count on was therefore 171 officers and 3,551 men. The months of the most intense heat followed by the very severe rainy season were approaching. For an effective occupation of the country it was necessary to wait the close of the rainy season and a supply of new troops. Practically all the Volunteers consented to remain on until their places were filled up.

Re-organisation of the American Forces.—The first step, however, to be taken was to form the new forces required.

On the 2nd March, 1899, Congress authorised an army of 65,000 Regulars and 35,000 Volunteers until the 1st July, 1901, at which date the strength was again to be reduced to 29,000 Regulars.[1]

The Volunteers were organised into 25 regiments :—

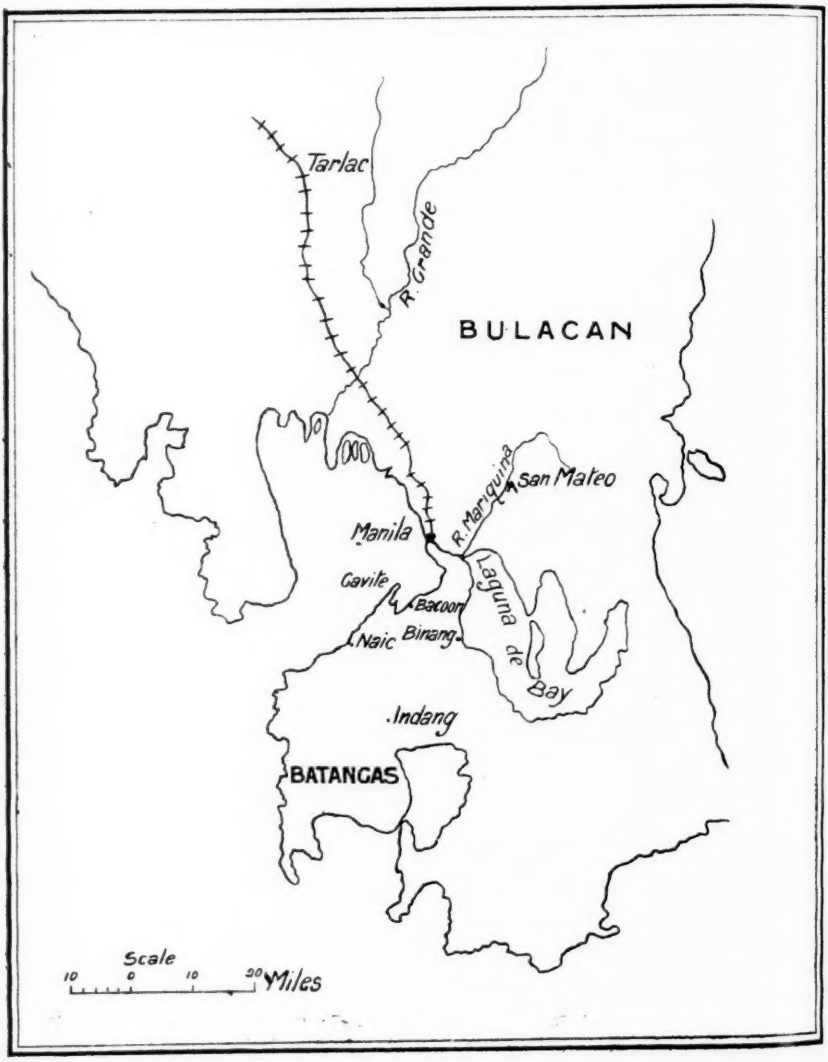
22 white infantry regiments.
2 coloured „ „
1 white cavalry regiment.

The officers of the new Volunteer regiments were obtained thus :—

—	Officers.	Men.	Total.
From Regular Army	136	91	1,210
From Volunteers who served in Spanish-American War	785	198	

[1] Congress in January, 1901, authorised a Regular Army minimum strength 58,924, maximum 96,766.

COUNTRY NEAR MANILA.



All the colonels were officers of the Regular Army. The appointments were as nearly as possible distributed among the several States and Territories according to the population. Vacancies occurring in the regiments were to be filled by promotion of the enlisted men. "This policy gives satisfaction to both officers and men, and no better encouragement can be given for soldierly conduct than this hope of reward."

For the Volunteer coloured troops the captains and lieutenants were selected from among the non-commissioned officers of the coloured regiments of the Regular Army, those who had distinguished themselves in the Santiago campaign being given preference.

The Regulars were enlisted for three years.

The whole of the 35,000 Volunteers and about 25,000 Regulars were gradually shipped as formed units to the Philippines, so that by October there were available there about 61,000 men.

Operations during Summer 1899.—The operations of the period from February to the end of August were marked by a steady maintenance and strengthening of the positions held by the Americans, a gradual extension of their lines, a restoration of security and confidence in the city of Manila, and numerous engagements marked by unbroken success. On account of the paucity of troops no attempt was made to occupy the country except in the vicinity of Manila. A few columns only were sent out to break up threatening concentrations of the insurgents near the American positions.

Commencement of the Winter Campaign.—By the 10th October the process of changing armies and the approach of the dry season had reached a point when an advance towards a general occupation was justified. Thanks to the large inland lake, Laguna de Bay, the American position at Manila divided the insurgent forces into two widely separated parts. South of it were numerous bands, who occasionally concentrated for attack; north of it was Aguinaldo, with his head-quarters at Tarlac (60 miles north and 20 miles west of Manila).

One column under General Schwan (1,726 men) was sent south and broke up the insurgents without difficulty.

Three columns were sent out to clear the great central plain, which extends for 120 miles northward of Manila :—

No. 1, on 12th October, under Generals Lawton and Young, moved up the Rio Grande, N.N.E. at first and then turning N.W.

No. 2, on 6th November, under General Wheaton with 2,500 men was conveyed in transports to Lingayen, in the Gulf of that name (100 miles north and 40 miles west of Manila), to land at the N.W. corner of the plain to occupy the coast road and move eastwards to meet Lawton.

No. 3, on 5th November, General McArthur moved up the Manila-Tarlac-Lingayen Railway to drive the insurgents towards the line held by the other two columns.

The operations, although carried out under great difficulties owing to the almost impassable condition of the country, were entirely successful. The second column had to take one entrenched position held by 1,200 men by assault, but most of the insurgents, including Aguinaldo, fled. Large quantities of supplies, ammunition, guns, tools, money, records and despatches, and the powder factory and arsenal were captured.

By the end of November, the insurgent Government was broken up, the Treasurer, Secretary of the Interior, and President of Congress captured, and the organised forces in the north-west of Luzon destroyed.

A pursuit was carried out in the western and northern parts of the island, resulting in the rescue of nearly all the American prisoners and the greater part of the Spanish prisoners held by the insurgents, in the capture of many of the leading insurgents, and in the capture and destruction of large quantities of arms, ammunition, and supplies.

Situation at end of 1899.—There still remained a large force of insurgents in the provinces south of Manila, and a considerable force in the eastern portion of the island, principally in the province of Bulacan.

In the extreme south-east of Luzon, and in the various Visayan Islands, except Negros, armed bodies of Tagalogs had taken possession of the principal sea-coast towns and were exercising military control over the inhabitants.

Communication between the insurgent troops north-east and south of Manila was maintained by a road and trail running along and near the eastern bank of the Mariquina River and shore of the Laguna de Bay. This line of communication was strongly fortified and held.

Lawton's Column.—With the object of taking possession of it, a column under the command of Major-General W. Lawton, left Manila on 18th December, and by the 29th December had captured all the fortified posts of the insurgents and taken possession of the line, dispersing all the insurgent force in that part of the island. In the course of the operations the American Army suffered the irremediable loss of General Lawton, who was killed while supervising the passage of his troops over the Mariquina River, at San Mateo.

Bates' Operations in Cavité—On the 4th January, 1900, General J. C. Bates commenced an active campaign in the region south of Cavité. While a body of troops under General Wheaton, held the enemy in front, south of Bicoor, a force under General Schwan moved down the western shore of the Laguna de Bay, to Binang, and then, turning south-west, seized the Binang, Indang, and Naric road, broke up the insurgents driven south by General Wheaton, and prevented their retreat to Batangas. Only a few scattered bands escaped. By the 8th February, the organised forces of the insurgents in this region had ceased to exist.

Kobbé's Expedition to Hemp Ports.—On the 18th January an expedition, under Brigadier W. A. Kobbé, sailed from Manila to expel the Tagalogs, who had taken possession of the principal hemp ports situated in the south-east of Luzon, and in the Islands of Sarma and Leyte (S.E. of Luzon

The expedition was successful, and garrisons were placed in the ports, strong resistance being met with only at Legaspi (in S.E. Luzon).

Bell's Expedition to the Camarines.—On the 15th February an expedition under Brigadier-General J. M. Bell, sailed from Manila to take possession of the Camarines provinces (which form the northern coast of the southern portion of Luzon), in which the insurgent forces had been swelled by the scattered bands escaping from the operations in the north and south. The insurgent force was defeated after a sharp engagement near the mouth of the Bicol River, pursued and scattered. Large amounts of artillery and war material were captured.

Similar expeditions, meantime, were successfully made to the various islands of the Visayan group.

Bates in Mindanao.—In the latter part of March, General Bates proceeded with an infantry regiment to establish garrisons in Mindanao (the southernmost island of the Philippines). The resistance offered was only of a trifling character.

On the 5th May, Major-General Macarthur took over the command of the American forces from Major-General Otis, who returned home at his own request.

Guerilla War Commences.—With the execution of the operations above related all formal and open resistance to American authority in the Philippines terminated, leaving only an exceedingly vexatious and annoying guerilla warfare. As rapidly as the Americans occupied territory they invited the inhabitants to return to their peaceful avocations, aided them in the re-establishment of their local governments, and promised them protection. The giving of protection has led to the distribution of troops to over four hundred different posts ; for the Tagalogs, who are in rebellion, have deliberately adopted the policy of murdering, as far as they are able, all of their countrymen who are friendly to the United States.

By constructing roads and making rapid communication possible, so that each post may effectually protect a larger section of country ; by establishing personal relations with the inhabitants, so as to obtain trustworthy information, and by showing the benefits of American control it is hoped that it will be possible to introduce good civil government and gradually replace the American by native troops under American officers.

In view of our own problem in South Africa, the following extracts from General Macarthur's report, dated Manila, P.I., 1st October, 1900, are of some interest :—

Extract from General Macarthur's Report.—" At a council of war held at Bayambang, Pangasinan, about 12th November, 1899, which was attended by General Aguinaldo and many of the Filipino military leaders, a resolution was adopted to the effect that the insurgent forces were incapable of further resistance in the field, and as a consequence it was decided to disband the army, the generals and the men to return to their own provinces, with a view to organising the people for general resistance by means of guerilla warfare.

"Systematised regulations for the government of guerillas have been compiled and published by the Filipino Revolutionary Committee in Madrid, Spain.

"In war, relative situations frequently count as much as positive strength, a principle which, consciously or otherwise, the insurgent leaders possibly had in view in making such a change of methods, as the country affords great advantages for the practical development of such a policy. The practice of discarding the uniform enables the insurgents to appear and disappear almost at their own convenience. At one time they are in the ranks as soldiers, and immediately thereafter they are within the American lines in the attitude of peaceful natives, absorbed in a dense mass of sympathetic people, speaking a dialect of which few white men, and no Americans, have any knowledge.

"A widely scattered formation of the Filipinos quickly followed the adoption of the guerilla policy above referred to, which led to a corresponding dissemination of American troops, the rapidity and extent of which may be appreciated by reference to the fact that 53 stations occupied in the Archipelago on 1st November, 1899, had on 1st September, 1900, expanded to 413. Of course, under the conditions described, all regular and systematic tactical operations ceased; but as hostile contact was established throughout the entire zone of activity, an infinite number of minor affairs resulted, some of which reached the dignity of combats. As the actions themselves were isolated, a connected narrative thereof is impracticable, and in view of the record of events which has been regularly transmitted by semi-monthly instalments, it is not necessary for information of the Department.

"It may be stated, however, that the casualties arising from this irregular warfare in the American Army between 1st November, 1899, and 1st September 1900, were 268 killed, 750 wounded, 55 captured; the Filipino losses for the same time, so far as on record, 3,227 killed, 694 wounded, 2,864 captured. It may also be stated in conclusion of this paragraph, that the extensive distribution of the troops has strained the shoulders of the Army to the full limit of endurance. Each little command has had to provide its own service of security and information by never-ceasing patrols, explorations, escorts, outposts, and regular guards. An idea seems to have been established in the public mind to the effect that the field work of the army is in the nature of police, in regulating a few bands of guerillas, and involving none of the vicissitudes of war. Such a narrow statement of the case is unfair to the Service, as in all things requiring endurance, fortitude, and patient diligence, the guerilla period has been pre-eminent.

"The Filipinos are not a warlike or ferocious people. Left to themselves, a large number (perhaps a considerable majority) would gladly accept American supremacy, which they are gradually coming to understand means individual liberty, and absolute security in their lives and property. The people of the islands, however, during the past five years have been maddened by rhetorical sophistry and stimulants applied to national pride, until the power of discriminating in behalf of matters of

public concern or private interest (never very strongly established among them) has for the time being been almost entirely suspended. As a substitute for all other considerations, the people seem to be actuated by the idea that in all doubtful matters of politics or war, men are never nearer right than when going with their own kith and kin, regardless of the nature of the action, or of its remote consequences.

"This peculiar psychological condition has raised practical difficulties in obstructions of pacification. For example, most of the towns throughout the Archipelago, under the advice and control of military authority, have organised municipal governments, for which kind of local administration the people have evinced such intelligent capacity as to encourage the expectation of rapid progress in the art of self-government, when the larger political administrations are organised.

"The institution of municipal government under American auspices, of course, carried the idea of exclusive fidelity to the sovereign power of the United States. All the necessary moral obligations to that end were readily assumed by municipal bodies, and all outward forms of decorum and loyalty carefully preserved. But precisely at this point the pyschological conditions referred to above began to work with great energy, in assistance of insurgent field operations. For this purpose most of the towns secretly organised complete insurgent municipal governments to proceed simultaneously and in the same sphere as the American governments, and in many instances through the same *personnel*; that is to say, the presidents and town officials acted openly in behalf of the Americans and secretly in behalf of the insurgents, and, paradoxical as it may seem, with considerable apparent solicitude for the interests of both. In all matters touching the peace of the town, the regulation of markets, the primitive work possible on roads, streets, and bridges, and the institution of schools, their open activity was commendable; at the same time they were exacting and collecting contributions and supplies and recruiting men for the Filipino forces, and sending all obtainable military information to the Filipino leaders.

"Wherever, throughout the Archipelago, there is a group of the insurgent army, it is a fact beyond dispute that all contiguous towns contribute to the maintenance thereof. In other words, the towns, regardless of the fact of American occupation and town organisation, are the actual bases for all insurgent military activities; and not only so in the sense of furnishing supplies for the so-called flying columns of guerillas, but as affording secure places of refuge. Indeed, it is now the most important maxim of Filipino tactics to disband when closely pressed and seek safety in the nearest *barrio*—a manœuvre quickly accomplished by reason of the assistance of the people and the ease with which the Filipino soldier is transformed into the appearance of a peaceful native, as referred to in a preceding paragraph.

"The success of this unique system of war depends upon almost complete unity of action of the entire population. That such unity is a fact is too obvious to admit of discussion; how it is brought about and maintained is not so plain. Intimidation has undoubtedly accomplished

much to this end, but fear as the only motive is hardly sufficient to account for the united and apparently spontaneous action of several millions of people. One traitor in each town would eventually destroy such a complete organisation. It is more probable that the adhesive principle comes from ethnological homogeneity, which induces men to respond for a time to the appeals of consanguineous leadership, even when such action is opposed to their own interests and convictions of expediency. These remarks apply with equal force to the entire Archipelago, excepting only that part of Mindanao occupied by Moros, and to the Jolo group. There is every reason to believe that all of the Moros are entirely satisfied with existing conditions and are anxious to maintain them."

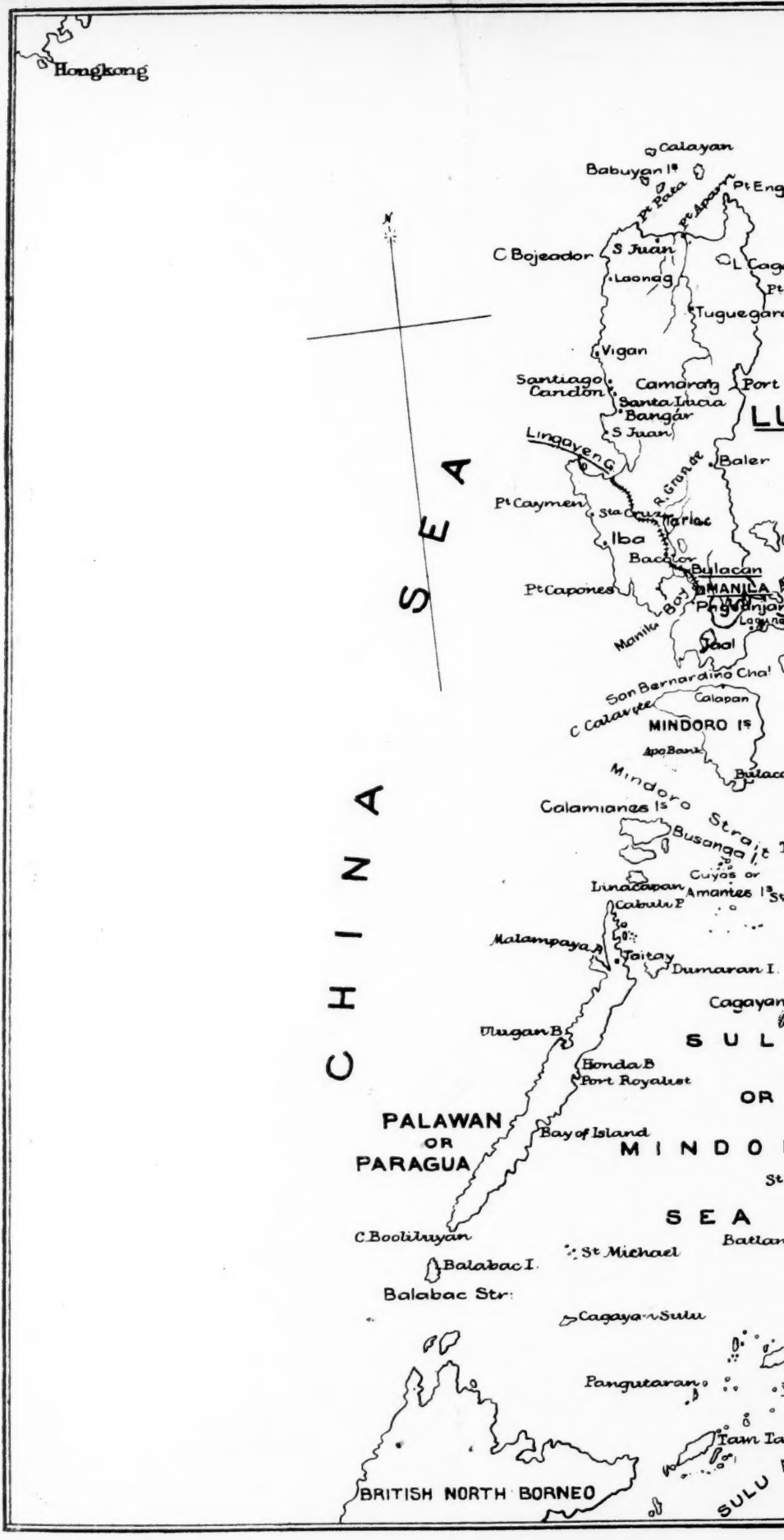
As regards the general sentiment of the Filipinos, General Macarthur reports as follows:—

"Compiled from an infinite number of interviews with all classes, a composite statement something to the following effect might be constructed, each of the sentiments of which has been uttered by one or more natives, but all of which, so far as known, have not been expressed by any one individual:—

"United States having acquired sovereignty by treaty in a way, own the Philippine Islands, but they do not own the Filipino people; which is the same as saying the United States own a tenement, but they do not own the tenants. Mutual control of the premises is almost important, as without it there can be no permanent prosperity for either party of interest. America can rule by force, but the only way to realise American expectation in the islands is through conciliation. Americans can do almost anything if the Filipino people are with them; otherwise, unending discord, conspiracy, and strife. We are not fighting to drive Americans from the islands, but to convince them that we are not children; that we have ideals, aspirations, and hopes which must be recognised by giving us a Government generally acceptable, and in the construction of which we must be consulted. The problem is, to reconcile American supremacy with the ambition of the American people; the necessary degree of American control with the national aspirations the Filipinos have recently developed. America must furnish the solution."

The sentiments of the American people towards the Filipinos are perhaps best expressed in the words of a popular American author:—"We will give them a constitution suited to their needs, which are small, and we will do what we —— please with them, making up our minds as we go along."

Strength of American Forces.—On 30th November, 1900, the strength of the American forces in the Philippines was 2,367 officers, 71,727 men.



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Albay
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Palapa Town & Port
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Catbalogan
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Dinagat or Bellavista I.
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Sarangani I.
Sanguitan P.
Belk or Hummock
Sulu
Pata
Lopak
Tawi Tawi
Masbate
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Sibuyan I.
Capiz
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Guimaras
Hymamayan
Dumaran I.
Cagayan Is
Ambilan
Dapitan B.
Pt Maralag
Gorda P.
Batlampon P.
Linao B.
Tuna B.
Cuyos or Amantes Is
St Joseide
Busanga I.
Tibao
Pt Poro
Calapan
Bulacao
Tablas I.
Lagonoy Gulf
Batan Gulf
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Caraga
Mayao
Davao
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Ambilan
Fuegos or Squiker
Bombonon Pt

THE LESSONS OF THE SOUTH AFRICAN AND CHINESE WARS.

By FRITZ HOENIG.

Translated from "Die Woche," No. 1, 1901.

THE art of war cannot be codified ; the conduct of a war is dependent on country and people, climate, nature of ground, etc., and above all on the aim of the war. Every war can change its character.

On the Boer side it is a national war, Government and people at one. On the English side an annexation war, the destroying of a nation ; and if words were facts, since the annexation England has only to deal with rebels. Over-sea wars may lead to other wars ; the home defences must reckon therewith. If England were now attacked by a powerful sea and land Power (or by a coalition), her condition would soon be worse than that of the two Boer Republics.

So long as England has a great naval superiority the mother country is best protected by her fleet. This superiority diminishes yearly with the French and German plans of 1900 and Russian exertions. Moreover, England is no longer able to man her fleet properly.

Under these circumstances the time is approaching when the fleet will not suffice to protect the mother country, and England must then have recourse to a great army reform. As such a reform will need many years before it is in proper working order she must start soon, for every year her military position is growing worse. What General Mercier said the other day is by no means a wild dream. With an adequate sea force and proper preparations the landing of masses in Great Britain is quite possible.

There are no special lessons to be drawn from the Chinese business.

It is different with South Africa.

The Boers at the last hour took the political offensive, delivered an ultimatum and pressed into Natal. This systematically prepared offensive appears the ideal of a strategic surprise, by which the weaker Power can secure great advantages at the commencement. Such sudden attacks are as old as strategy ; their success depends on an exact knowledge of the enemy's condition, on good plans and clever execution, but according to scientific theory, presume a Standing Army, for *it* alone can be ready for operations immediately after the declaration of war. The alliance of the Republics rendered possible the carrying out of the plan, their frontiers would be effectively covered by the seizure of the tongue-shaped part of N.W. Natal, and at the same time all the passes be secured.

The march of the different columns of the allies through the passes and their concentrating about Ladysmith upset the idea that from want of preparation and incapacity a levy *en masse* could not seize the strategic offensive immediately after the declaration of war (and that against Regular troops), and the way it was conducted, accompanied by bloody fights, was almost without friction. General White was shut up in Ladysmith. Here is another phenomenon which finds its explanation in the peculiarities of the Boers. They found Natal the most suitable theatre of war for their method of fighting. They now were on English ground, they had beaten the enemy and shut him up, they had safe communications, the Tugela was strategically and tactically a strong line. They might hope by these successes to induce the Dutch in Natal and particularly in Cape Colony to espouse their cause.

As they pressed into Cape Colony to stir it up and cut the English rails, there arose two more theatres of war besides Natal, namely, South of the Orange River and South of Kimberley, each requiring its commander. All the commanders had to act on one common plan. As in Natal, the Boers attained their first objects in these theatres. Their chief advantage was in Natal, as by the investment of Ladysmith they hoped to force the English to send their main force to Natal. General Buller foolishly carried out the wishes of the Boers and also split up his army corps, so that on no one of the three fields of operations could he appear with the necessary superiority. The levy of the Boers lacked, however, a reliable organisation, military discipline, and, lastly, a settled commander-in-chief over the forces of both Republics; above all, they lacked the necessary knowledge, the appliances and war material for siege operations, and it was just from these wants that the Boers let themselves in. Patriotism, endurance, shooting powers, and mobility of the individual could not make up for them.

Recognising their limited strategic capabilities and want of war material, the Boers stopped the strategic offensive at the Tugela. That was right, but they were wrong in not employing the tactical offensive. Ladysmith was not a fortress, the junction of railways and roads only acquired its great strategical importance from its nearness to the Tugela, and because General White, having surrounded himself with fortifications, held his ground there. In view of this situation and the great superiority of the enemy in power, means, money, and politics, the Boers should have pulled themselves together and stormed Ladysmith as quickly as possible. The attempt on Cæsar's Camp proves that a well-planned attack would have succeeded. The Boers, however, showed themselves incapable of the requisite discipline and organisation, their personal peculiarities stood in the way of the rigid unity of action which was required. As the forces remained unorganised, so the conduct of the war could not be organised.

The lesson we have here is of decisive importance for the whole course of the war. The Boers could not, owing to their political and individual peculiarities, submit to discipline and organisation; this is the chief cause of their misfortunes.

An enemy cannot be crushed by purely passive fire action; it is necessary to move! The weaker force cannot lay down a great strategical scheme on account of his lesser powers, but the tactical offensive when he has beaten off an attack is a necessity, for his great chance is that from the sum of the individual complete successes the war may eventually turn in his favour. With the results achieved by the Boers on the Tugela and the Modder before us, and the perfecting of fire-arms, this is the most important and certain lesson of modern times, a lesson which can be applied to any theatre of war in Europe—a ray of hope for the weaker States. The Army of a weak State must possess in conjunction with the marksmanship and mobility of the Boers, the desire and ability to assume the offensive, and must therefore be carefully trained in the tactical offensive in time of peace.

The so-called offensive-defensive or counter-offensive has always been the pet idea of the tactician; now there is the long list of cases in this war when it was not only possible and desirable, but would have been accompanied by decisive results. That it was not carried out is not due solely to want of organisation, intelligence, and judgment, but also to the psychology of the Boers. As John de Witt said of the Dutch, it is only when the danger stares them in the face that they rise to it.

What has been said as to Ladysmith applies more or less to Kimberley and Mafeking. The idea of the operations in Cape Colony was to rouse the Cape Dutch against the English. There is no question of science in this part of the business, although some of the tactical points previously touched on recur here. After the relief of Kimberley, strategy as far as the Boers were concerned was over. The war was carried on without plan, the guerilla warfare developed and gradually assumed its present form.

England has, however, been forced to exert herself greatly against the bare 50,000 Boers. The war has cost her till now more than £20,000,000, and her field army has been repeatedly brought to a standstill from sickness, casualties, and want of horses. At the end of May there were about 42,000 in the hospitals (counting casualties), nearly a fifth of their entire strength. The Standing Army and Militia reserves were exhausted practically in January, before February England raised 13 new battalions, a cavalry regiment, 6 horse, 13 field, and 3 howitzer batteries, besides 7,893 Volunteers, 24,000 Militia, and 10,663 Yeomanry. Until the end of April 277 steamers were chartered, which conveyed 201,474 men, 34,384 horses, 110 machine guns, 316 field guns, 42 howitzers, 16 siege and 6 mountain guns, to Africa. At the outbreak of the war there were 8,000 Regulars in South Africa, to whom must be added 22,000 South African Volunteers. The number of natives employed in auxiliary services is not known.

Before the end of April 60,000 horses, 17,000 mules were sent, and 15,000 horses, and 6,000 mules ordered, which have since been sent. Up to the same time rations for 220,000 men and 90,000 beasts were sent. Only such a rich country and so technically and commercially developed, at the same time having command of the sea, could attempt such

performances; it beats anything in military history. These performances show what resistance a trained European Conscript Army would be capable of and what power it would require to defeat it. The Boer War had an example in the War of the French Republic 1870-71, it will in future be more or less inseparable from it.

England has now an army of 28,000[1] men in South Africa, but it is for the most part played out, deficient of officers, and unfit for further employment.

That a peasant people possessed only of mounted infantry has forced England to this great putting forth of her strength is something novel, and these Boers have from the commencement fought in larger or smaller bands. That leads one to tactical and technical grounds. Nowhere have the disappointments been greater, nowhere the apprehensions better grounded than here.

First as to the technical: cyclists and balloons have been of no use worth mentioning, armoured trains were no use, signalling alone proved of value at Ladysmith and Maseru. But, on the other hand, the providing of material ready for bridge building, for restoring bridges and railways and for telegraphs by the manufacturing country gave a great superiority to its army. And it is chiefly to this fact and the excellence of her railway troops that England has to be thankful that she has been spared catastrophes. Against that, the defeats on the Tugela are partly to be put down to want of reliable maps. The administration had neglected this important business.

England gained nothing by her numerous guns. Excepting at Paardeberg, the artillery have effected next to nothing. It could not hit; the lyddite shells—similar from their ineffectiveness to our abolished *Spreng-granate*—even when they landed where intended rarely caused serious wounds. The Boers, however, knew how to deceive the English artillery and infantry as to their position as a rule. Both arms wasted on false targets any amount of ammunition, which had little or no effect. The English do not seem to understand how to use their glasses. Smokeless powder was not used as a rule by the Boers, and the clear air of South Africa makes observation much easier.

Both the defective musketry training and the ancient method of infantry attack conduced to the English defeats.

Till Lord Roberts appeared on the scene there were only frontal attacks, besides which the English infantry stuck to volley-firing. This latter necessitates remaining a long time in close formation. Naturally the English suffered—as they might have anticipated—the heaviest losses between 1,200 and 600 yards, against the Mauser rifle, which was superior to their own; the attacks were stopped as a rule at 900 to 1,000 paces, frequently without the infantry having commenced firing. Later on the casualties of the English were fewer, because Lord Roberts knew how to make use of turning movements, artillery fire, and fighting in skirmishing order; still they always remained heavy. Eventually the

[1] Probably 228,000 is intended.—TRANSLATOR.

losses were diminished from the wearing of khâki uniform, but its advantage was only recognised after many defeats. Of the use of the spade in the fight, for intrenching, little is said; it was only after defeat that the English threw up earth-works. Their night attacks failed utterly.

On the side of the Boers, wire obstacles in the effective fire zone proved most efficacious, but even *they* made no use of the spade. Their cover as a rule consisted of heaped-up stones; the so-called S-shaped trenches have proved to be a myth; generally, however, they occupied, very cleverly, positions which lay one behind another.

Thus, again, from this war we draw the lesson as to the decisive effect of the rifle fire of skirmishers, but that must not lead us to underestimate the value of *good* artillery fire. Taken as a whole, the armament of neither side is up to the level of the day.

The apprehensions as to the terrible mutilations to be caused by small-bore rifles have proved to be unfounded; the Mauser rifle wound, as a rule, healed easily and quickly, although the English medical arrangements are among the weakest points of their organisation and quite inadequate.

The supposition that the English attacks were repulsed on account of their heavy losses is wrong. At Colenso the highest loss in two companies was only 21 per cent., while the average was only 5½ per cent. These defeats are therefore not to be attributed to physical but to moral causes, and this evidence of the want of *moral* of the troops repeats itself.

	Per cent.
At Dundee the average loss was	4
Elaandslaagte ,,	9
Stormberg ,,	3·6
The Modder ,,	6
Maggersfontein ,,	9
Spion Kop ,,	7
Belmont ,,	4
Graspan ,,	2·5
Compare that with the losses of the 77th Austrian Regiment at Skalitz	46
Several Prussian regiments at Mars la Tour lost between	37 & 45
Some French units at Wörth	90
Several Russian, in 1877, between	50 & 75

The average German loss, for example, was :—

At Mars la Tour	22·4
St. Privat	10
Wörth	11
The French at Wörth	15·7
,, Sedan	18·9
The Russians at Plevna	28

The reconnaissance duties on both sides were very poorly carried out, particularly on the English side.

A peculiarity of the Boer war is the absence of big decisive actions in the field (with the exception of Paardeberg). The Boer tactics save men, the Boer policy was to avoid any chance of a big unfavourable decisive fight; and the English never succeeded, notwithstanding their frequent skilful turnings of the Boers flanks, with considerable mounted forces, in preventing the Boers getting away in good time. The Boers showed a cunning at this game which has never been attained by any Army. It is due primarily to their cleverness in moving mounted and fighting dismounted. By avoiding all decisive actions, which might be unfavourable, they have succeeded in dragging on the war in an astonishing way.

The geographico-strategical frontiers, the railway, the capabilities of their horses should have led the Boers to have taken up the inner lines when Lord Roberts turned towards Bloemfontein, and also later. They missed here the chance of systematic working together. Only latterly is any systematic procedure apparent.

The Boer war teaches how great can be the resistance of a determined national levy against a crushing superiority, and how important in war are the moral forces. The generation of huge numbers may lay it to heart.

ON THE EMPLOYMENT OF DIRECT-CURRENT DYNAMOS FOR THE PRODUCTION OF THREE-PHASE CURRENTS FOR VENTILATING MOTORS ON BOARD GERMAN WAR-SHIPS.

From an article by Marine-Engineer CHRAPKOWSKI, in the "Marine Rundschau," August-September, 1900.

Translated and abridged by Fleet-Engineer T. J. HADDY, R.N.

THE first consideration for all changes and improvements in the fittings on board ship is based on the question of their military value and suitability for sea service. The constant aim of such improvements and changes is the attainment of the highest state of perfection in our war-ships, that is, their maximum efficiency for fighting purposes. To this end, trials of various systems of engines and boilers and of different kinds of fuel have been carried out. The same cause has led to the present struggle for the supremacy between steam and electricity as the source of power for auxiliary machinery. The efforts of the marine engineer must always be directed towards this attainment of the highest state of efficiency in the whole machinery installation, the most important element in the ship, and which alone endows this dead body with life, movement, and capacity for action. The necessary conditions for this efficiency are absolute certainty in, and constant readiness for service, of the whole of the machinery under all ordinary conditions, and with the least possible dependence on the supervision of the *personnel*.

Since modern systems of machinery and boilers, by reason of their complicated construction and, in many respects, entirely new methods of management, together with insufficient experience of the practical results of their introduction, make the greatest possible demands on the care and attention, and intellectual and physical capacities of the engineering *personnel*, any simplification either in the details or in the installation as a whole, are to be ardently welcomed, and will mark a decided advance towards the wished-for perfection.

The auxiliary machinery on board war-ships, already legion in number and variety, is constantly increasing, and demands the services of an undue proportion of the engineering staff, and of a *personnel* which has in most cases to be specially trained and prepared for these duties. It would therefore be of the greatest advantage if this department of the machinery installation could be made practically self-sustaining, and more simple in working.

With this object in view, I purpose dealing with the projected installation of three-phase electric motors for ventilating purposes on board our war-ships, as, in my opinion, for constant readiness and security in working the three-phase system has great advantages over any other power source with which it can be compared. The problem here considered is neither a strange one nor difficult of solution, if alternating current generators, or, better still, polyphase current generators are available. For our purpose such an installation would be unquestionably the simplest and most suitable, because the polyphase generator is the most economical, and therefore the cheapest, source for polyphase or three-phase currents, and its employment for new installations is worth consideration, as having decided advantages. It could be arranged that the polyphase generator should be driven by a constant-current dynamo coupled direct on the shaft, or that the magnets of the primary machine should be excited by the current from the direct-current dynamo. This could be easily done, as practical experience shows the current required is only from one to three per cent. of the output of the dynamo. Taking the output as 60 kilowatts, which is the condition on board the cruiser "Fürst Bismarck" with a pressure of 110 volts, the exciting current required is only 10 amperes, equal to that absorbed by twenty 16-c.p. lamps.

As, however, up to the present constant-current machines alone are in use in our war-ships, and as this will probably continue to be the case for some years on account of the numerous difficulties in the way of using alternating currents, for instance, in working light projectors, the solution of the problem is not so simple. The question we have to answer then is this: under what conditions and to what extent is the working of three-phase ventilating motors possible and advisable with the present direct-current machines in use on board ship? Further, what modifications are necessary in the dynamos and the conductors? It may be stated at once here that our present direct-current installations are no hindrance to the fulfilment of the task, for three-phase currents can be produced from these machines just as well as from alternating-current dynamos. In the first case it is only necessary to make the requisite alterations. In order to make a clear understanding of the following proposals easier, I have thought it advisable to go somewhat fully into the nature of the three-phase current and to give a theoretical explanation of its properties. In my treatment of the subject I shall show the various ways in which the three-phase current can be obtained from direct-current machines and what alterations are necessary in the machines and their conductors to effect this result. I shall then show to what extent in the different classes of ships these arrangements may come into consideration with the present machines, and how such alterations should be carried out. In conclusion, I propose to compare the advantages and disadvantages of the three-phase current for the purpose aimed at with other sources of power. The description "three-phase current," *Drehstrom*, is applied to a particular kind of electrical current, viz., to an alternating current having three phases linked together in one period to produce a rotatory magnetic

field; the direct or constant-current machine producing, on the contrary, a uniform, and the ordinary alternating machine a pulsating magnetic field. All polyphase alternating machines in fact produce rotating magnetic fields, but these are wanting in the uniformity or symmetry which is the characteristic of the three-phase system. In this lies the great importance of the latter in electrical science and its exceptional suitability for working electric motors. Three-phase motors claim the advantage

Fig. 1

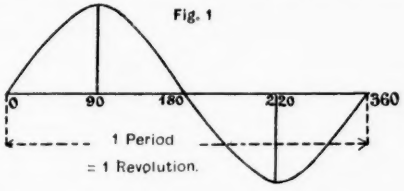
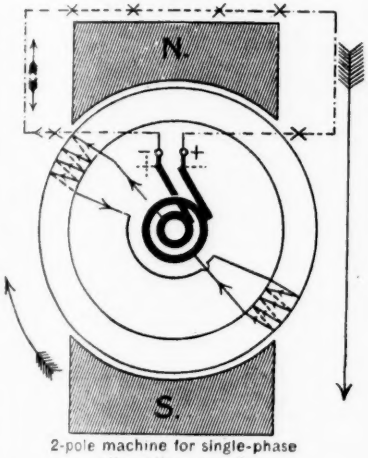
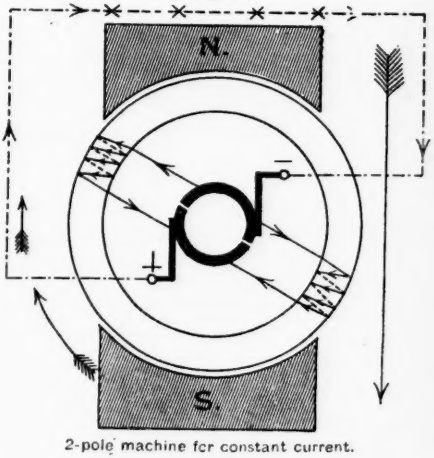


Fig. 2



2-pole machine for single-phase alternating current.

Fig. 3



2-pole machine for constant current.

Fig. 4

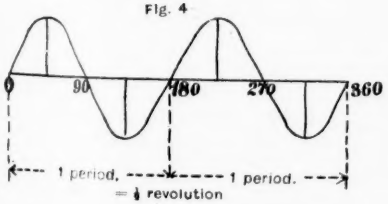
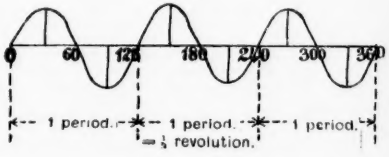


Fig. 5



that they will start in all positions without special attention or mechanical aid. What do we understand then by "phase," and polyphase currents? It is well known that if a spiral coil of copper wire is rotated in a magnetic

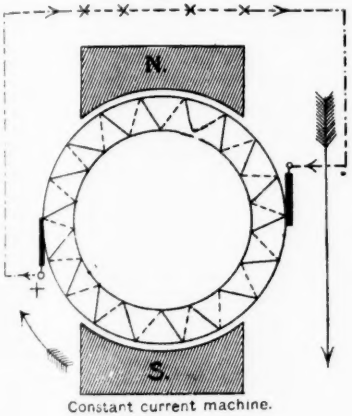
field an electric current will be induced in the coil, the strength of which will depend on the number of lines of force cut by the coil in a unit of time. This strength at any instant can be graphically represented by the sinuous line as in Fig. 1. In the rectangular system of co-ordinates each point in the line represents by its ordinate the strength of the induced current for that particular position of the coil in the magnetic field, and the abscissa equally represents the angle through which the coil has rotated.

The maximum value of the current excited by a two-pole magnetic field is when the angle of rotation a equals 90° and 270° (Fig. 1.), and is given by the amplitude of the curve, and its value at any point in the curve divided by the amplitude is the "phase" of the current at this point. The current, therefore, in the coil can be conceived as consisting of the sum of all its phases. The time which elapses between two exactly similar phases in magnitude and direction, that is, between two exactly similar points in the curve, is called the period. The length of the period can be expressed by the angle of rotation a, and is dependent on the number of magnet poles producing the field. In a two-pole field the period is expressed by the angle 360°, or one complete revolution of the coil (Figs. 1, 2, and 3). If four poles are employed the period is represented by half revolution 180° (Fig. 4); with six poles one-third revolution or 120° (Fig. 5), or with eight poles one-quarter revolution 90° (Fig. 6), etc.

From this it is evident that by increasing the number of poles producing the magnetic field, the length of the periods in the armature of the dynamo is shortened. The current induced in a coil or a pair of coils, by which is understood two coils disposed diametrically opposite each other, and so connected that the two induced currents added together give the difference of potential, will enter the external circuit as a single-phase alternating current if it is taken from two opposite points of the armature coil, which may be continuous, enveloping the whole circumference of the armature core. This current is taken off by means of two collector rings insulated from each other and from the armature shaft, connection with the external circuit being made by sliding contacts; the two rings are connected to the two opposite points of the armature coil by suitable conductors (Fig. 2). If, on the other hand, a commutator is employed instead of collector rings with which the coil is connected as in Fig. 3, and the current is led into the external circuit by means of brushes lying in the neutral magnetic zone, or if the current is taken off on the neutral axis by brushes bearing directly on the coil as in Fig. 6, the current in the external circuit will be a direct or uniform one such as is always used for incandescent lighting and search-light projectors on board our war-ships. Let now a second coil or pair of coils be arranged on the armature at right angles to the first pair (Fig. 7), and revolved in the same direction and at the same speed, the induced currents will be represented by a pair of sinuous lines, the equal phases, however, will not coincide, but will be displaced to the same extent as the coils, viz., 90° apart, or one-quarter period as shown in Fig. 8. In this case we have,

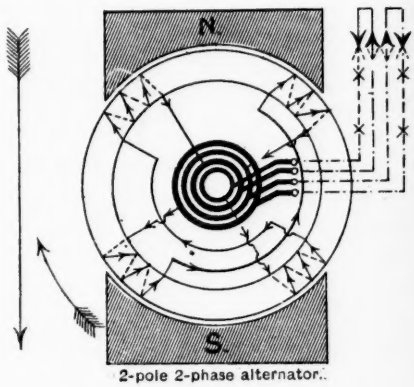
with four collector rings, a two-phase alternating current (Fig. 7). With three pairs of coils at angles of 60° with each other, we have in the same way a three-phase alternating current displaced one-sixth period apart and represented graphically in Fig. 10. In this case six collector rings

Fig. 6



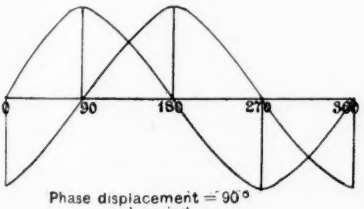
Constant current machine.

Fig. 7



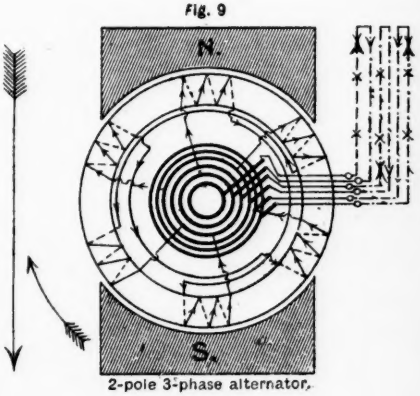
2-pole 2-phase alternator.

Fig. 8



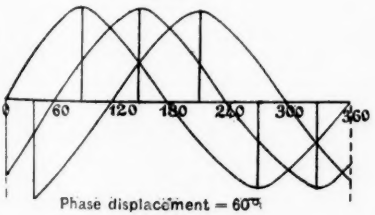
Phase displacement = 90°
= ¼ period.

Fig. 9



2-pole 3-phase alternator.

Fig. 10



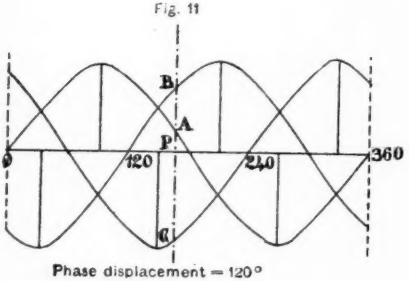
Phase displacement = 60°
= ⅙ period.

are required connected to the six points on the armature coil by suitable conductors.

The practical objection to the employment of single, double, and tri-phase alternating currents is that more than two conductors must be

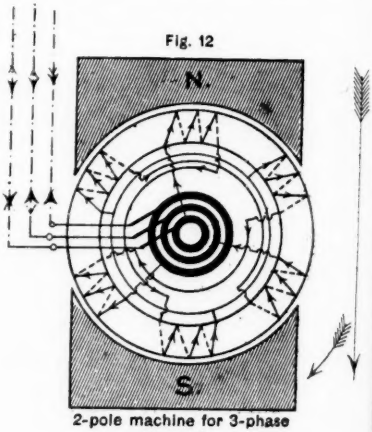
used in the external circuit; either four or three are required in the two-phase system, the latter when a common return wire is fitted. In the same way six conductors are required for a three-phase current, or four with a common return wire, thus adding considerably to the expense. This evil has been overcome in a simple and ingenious manner with respect to the three-phase system, by so arranging the three pairs of armature coils, or groups of coils, that the algebraical sum of their induced currents when rotating in a magnetic field is zero for every position of the coils. In Figs. 11 and 12 it is shown that these conditions are only fulfilled when the displacement of the phases is equal to one-third the period (Fig. 2), and this is the case when the groups of coils are at angles of 120° with each other. It can easily be shown, mathematically, that the sum of the currents is nil. Let the induced current in the three

Fig. 11



Phase displacement = 120°
= ⅓ period.

Fig. 12



2-pole machine for 3-phase currents.

pairs of coils at any instant equal i_1, i_2, and i_3, their amplitude equal J, and the angle of rotation a, then $i_1 + i_2 + i_3 = 0$, or from Fig. 11,

$$PA+PB+PC=0,$$

of which PC, because below the axis, represents a negative value. From Fig. 13 it follows at once :—

(1) $$i_1=J \sin a,$$

(2) $$i_2=J \sin (120+a),$$

(3) $$i_3=J \cdot \sin (240+a).$$

For the three pairs of coils are placed at angles of 120° with each other, transforming the equations :—

$$i_2=J \cdot \sin [(180-60)+a],$$

$$i_2=J [\sin (180-60) \cos a+\cos (180-60) \sin a],$$

$$i_2=J (\sin 60 \cos a-\cos 60 \sin a),$$

(4) $$i_2=J (\tfrac{1}{2}\sqrt{3} \cdot \cos a-\tfrac{1}{2} \sin a).$$

In the same way it follows that

(5) $$i_3 = J\,(-\tfrac{1}{2}\sqrt{3}\,.\,\cos a - \tfrac{1}{2}\sin a),$$

and $i_1+i_2+i_3 = J\,(\sin a + \tfrac{1}{2}\sqrt{3}\,.\,\cos a - \tfrac{1}{2}\sin a - \tfrac{1}{2}\sqrt{3}\,.\,\cos a - \tfrac{1}{2}\sin a)$, or

(6) $$i_1+i_2+i_3 = 0.$$

In consequence of the constant value of combined induced currents being equal to zero, the necessary conductors for the collection and transmission of these currents are reduced to three instead of six. For example, if the beginnings of the three groups of coils are led to three collector rings, as in Fig. 12, from which the current is led

Fig. 13

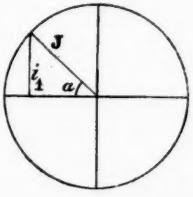
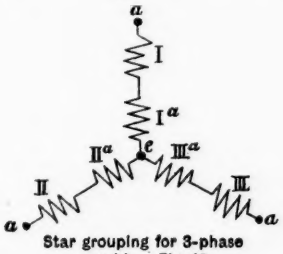


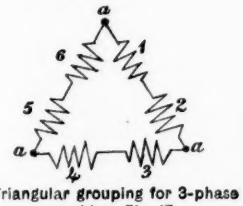
Fig. 14



Star grouping for 3-phase machine, Fig. 12.

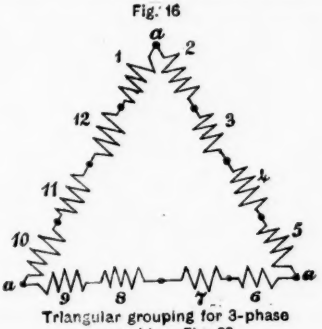
into the external circuit, then the three ends of these groups can be bound together direct—that is, can be short-circuited—and this is possible, because the sum of the induced currents at any instant is equal to zero. These considerations have led to the construction of the three-phase armature. Technically, there are two systems of coil grouping recognised which satisfy the conditions, and these are known as the "star" and "triangle" groupings, as in Figs. 12 and 14. The tri-phase current

Fig. 15.



Triangular grouping for 3-phase machine, Fig. 17.

Fig. 16



Triangular grouping for 3-phase machine, Fig. 23.

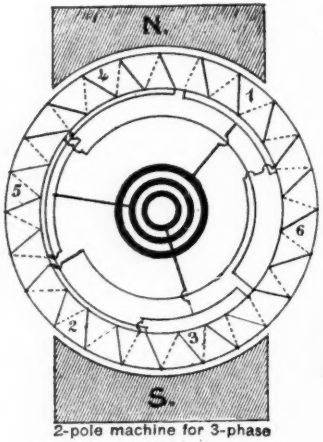
induced in such an armature is distinguished on account of the special grouping, as a "linked three-phase alternating current" or simply as the tri-phase system (German *Drehstrom*). As already indicated, this current produces an extraordinarily uniform rotating magnetic field, which is absolutely necessary for the perfect working of electric motors. This predominant quality which distinguishes it from all other polyphase

currents has secured its German name of *Drehstrom* (turning current). In the remainder of this article it will be spoken of as the tri-phase current.

The continuous-current machines on board our war-ships are without exception so arranged that the armature revolves in a magnetic field produced by fixed magnetic poles, two, four, or six in number (Figs. 18, 24, 25, 26, 27, 28, 29, 30). The modifications necessary for the production of the tri-phase current at the same time as the continuous current must therefore be made first in the armature. The alterations can be made in two ways:—

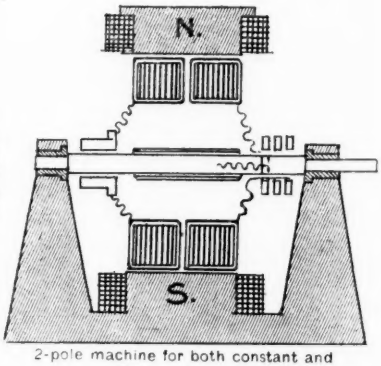
1. A tri-phase armature may be mounted on the same shaft as the continuous-current armature, but separate from it and well insulated (Fig. 18).
2. The continuous-current armature itself may be modified to attain the double object desired (Figs. 27, 28, 29, 30).

Fig. 17



2-pole machine for 3-phase currents.

Fig. 18



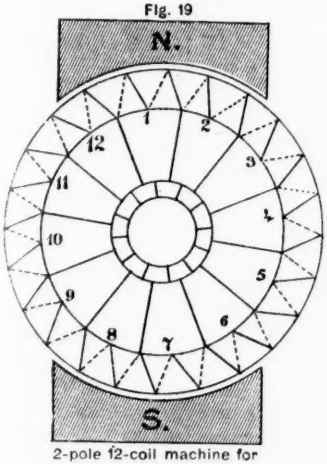
2-pole machine for both constant and 3-phase currents.

Both methods are good, but the first can only be considered, as a rule, in new installations, as, in general, dynamos on board ship are constructed with a view to the best utilisation of space, and are very compact, so that there is no room to fit the additional tri-phase armature with its contact rings. Besides this, the pole pieces would have to be made broader to provide a more extensive and efficient magnetic field (Fig. 18). Method 2 requires closer consideration, as the simultaneous production of the continuous and tri-phase currents in one and the same armature is only possible by making alterations in the armature coil or its grouping to satisfy the required conditions. The following observations will make this clearer.

As is well known, the continuous-current armature consists of an iron core and a copper wire winding with a commutator. The copper winding

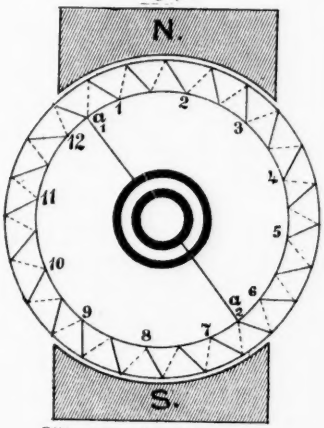
itself is divided into a large number of coils (Fig. 19), which are divided into two equal parts at the neutral axis, the points at which the induced currents are taken off from the commutator, so that they are divided in parallel. The whole armature winding, therefore, may be considered as two diametrically opposite single coils. They are put in parallel by the commutator, and we obtain in the external circuit a continuous current, always in the same direction (Figs. 3, 19). If we now take away the commutator, the two coils form a single coil (Fig. 20) extending round the whole circumference of the armature, and if we connect two opposite points, a_1 and a_2, of this coil with the two collector rings secured to the armature shaft and the currents be taken off these rings by sliding contacts, we shall now get in the outer circuit a single-phase alternating current (Fig. 2). The continuous current is, therefore, nothing more than a modified single-phase alternating one, and the continuous-current

Fig. 19



2-pole 12-coil machine for constant current.

Fig. 20



Ditto, altered for single-phase alternator.

dynamo nothing more than an alternating current machine with commutator. With additional collector rings connected to other opposite points on the armature coil, the two-phase and three-phase alternating currents can be obtained (a_3 and a_4, Fig. 21), Figs. 8 and 10, 9, 22.

Now, as we have shown, three of the collector rings can be dispensed with in the three-phase system, and instead of six points for the collection of the current 60° apart, only three at 120° are required (Figs. 12, 17, 23, 24), and consequently we obtain the tri-phase current when these three parts are connected to collector rings. At the same time we can see that the armature connections are more easily carried out when the number of the armature coils is divisible by three (Figs. 19, 24, 25, 26). As yet the experiments have been made with two-pole machines with the period of 360°, or a whole revolution of the armature. With four poles the period is 180°, with six poles 120°, or one-third revolution. We can then

easily see that the tri-phase current can be obtained from the continuous-current armature when we know the correct positions for the connections, and the result will depend not alone on the number of armature coils, but also on the number of magnet poles. In the following table is shown the different angular positions at which the current must be collected with different patterns of continuous-current machines :—

Table I.

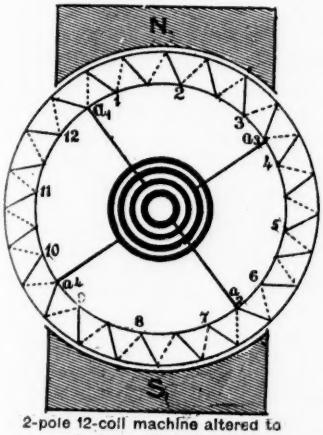
Number of Armature Coils.	Armature Coils from which the Induced Currents must be taken in order to obtain Tri-phase Currents.																Angular Position in Degrees of the Collector Connections.					
	Number of Magnet Poles in the Machine.																					
	2			4			6			8			10			12			2	4	6	8	10	12
42	1	15	29	1	8	15	—	—	—	—	—	—	—	—	—	—	—	—	120	60	—	—	—	—
45	1	16	31	—	—	—	1	6	11	—	—	—	1	4	7	—	—	—	120	—	40	—	24	—
48	1	17	33	1	9	17	—	—	—	1	5	9	—	—	—	—	—	—	120	60	—	30	—	—
51	1	18	35	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	120	—	—	—	—	—
54	1	19	37	1	10	19	1	7	13	—	—	—	—	—	—	1	4	7	120	60	40	—	—	20
57	1	20	39	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	120	—	—	—	—	—
60	1	21	41	1	11	21	—	—	—	1	6	11	1	5	9	—	—	—	120	60	—	30	24	—
63	1	22	43	—	—	—	1	8	15	—	—	—	—	—	—	—	—	—	120	—	40	—	—	—
66	1	23	45	1	12	23	—	—	—	—	—	—	—	—	—	—	—	—	120	60	—	—	—	—
69	1	24	47	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	120	—	—	—	—	—
72	1	25	49	1	13	25	1	9	17	1	7	13	—	—	—	1	5	9	120	60	40	30	—	20
75	1	26	51	—	—	—	—	—	—	—	—	—	1	6	11	—	—	—	120	—	—	—	24	—

NOTE.—Supposing each of the armature coils in Figs. 24, 25, 26, to represent three, they will give a very clear idea of the grouping of the coils in a 54-coil armature to obtain the tri-phase current with 2, 4, and 6-pole machines.

The table also shows that the number of coils which are suitable for the tri-phase current decreases with an increased number of magnet poles. This gives rise to the question how the selection is to be made when the number of armature sections is different from any shown in the table. The answer is, that the tri-phase currents can be obtained in every case. For instance, with a 4-pole continuous-current dynamo, having 50 coils or sections in the armature, Nos. 1, $9\frac{1}{3}$, and $17\frac{2}{3}$ must be selected and connected to the collector rings. The difficulties in the way of making such connections anywhere but with the outer layers of the coil, are practically insurmountable, considering the solidity with which an armature winding must be constructed in order to withstand the very considerable centrifugal and electrical forces which act upon it. In such a case it is sufficient to take the next nearest point in the coil where the connection can easily be made. The exact position for the connection is in this case not obtained, and the angular positions between the collecting conductors will not be quite equal, somewhat larger or smaller as the case may be, and the result of this will be that the sum of the three induced currents will not be quite zero in all positions. Another result will be a slight tendency to sparking at the commutator brushes and collector rings and heating of the armature coils which have their three ends short-circuited to avoid the necessity of six

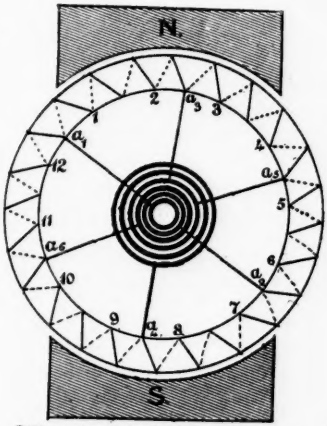
conductors. These defects are not of great importance, and are the less so the greater the number of coils and the less the number of magnet poles, as then the difference between the actual and the theoretical positions at which the current is taken is proportionately reduced. In

Fig. 21



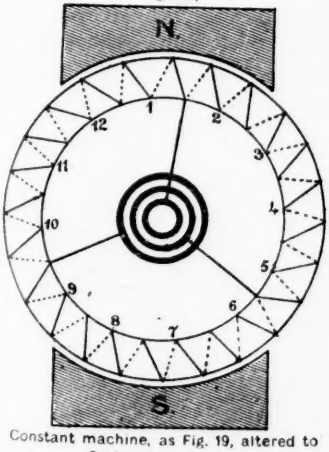
2-pole 12-coil machine altered to 2-phase alternator.

Fig. 22.



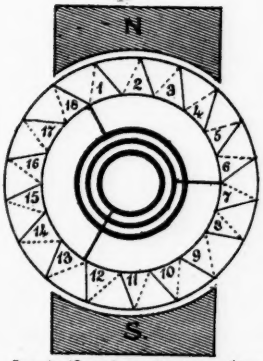
Ditto, altered to 3-phase alternator.

Fig. 23.



Constant machine, as Fig. 19, altered to 3-phase machine.

Fig. 24.



2-pole 18-coil constant machine altered to 3-phase.

Table I. the coils of the armatures are grouped in the triangular system (Figs. 16, 23).

In the following remarks I shall attempt to show the easiest and most advantageous manner in which the necessary alterations in the

continuous-current machines can be carried out in order to obtain the tri-phase currents from them. Two methods are possible :—

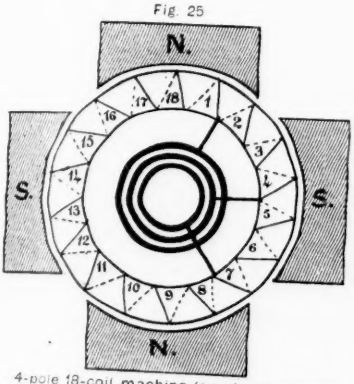
1. The collector rings can be placed on the same side of the armature as the commutator (Figs. 27, 28, 29).
2. They may be placed on the opposite side to the commutator (Fig. 30).

Both methods are equally satisfactory, although the method proposed in Fig. 30 would be difficult to carry out on board ship from want of space between the armature and the adjacent bearing. The methods shown in Figs. 27, 28, 29 necessitate in the first two cases an alteration of the foundation of the machine and a lengthening of the armature shaft, the collector rings being securely keyed on to the shaft, from which they are insulated, and the connections to the coils made by lengthening the proper commutator segments to make direct connection with the rings as shown in Fig. 30. In the third case (Fig. 29) the collector rings are fixed directly above the commutator, and the connections are made with the junction pieces of armature coils to commutator. The commutator is necessarily shortened and one of the sets of brushes, when there are two or three, must be dispensed with. The last alteration is, in my opinion, the simplest and most practical. In all three cases the same brush holder may be used both for the direct and the tri-phase currents, and the two can be used at the same time for internal lighting and search-light projectors and for the electric motors (Figs. 18, 27, 28, 29, 30). The best way to effect the necessary alterations will, of course, depend on the type of machine and the particular circumstances of the case. It now remains to be seen whether the tri-phase current can without exception be employed for ventilating motors on board ships, or only under certain conditions and what are the limitations of the system. The first requirement for the employment of the continuous current for internal lighting is the maintenance of a steady light, and this is obtained by the use of a large number of coils and commutator segments, combined with a high speed of rotation, the number of coils varying from 40 to 75, and the revolutions per minute from 350 to 600 in machines on board ship. For electric motors, on the other hand, the first necessity is the production of a uniformly rotating magnetic field in the motors. This is dependent on the number of periods per second obtained in the generator. As I have already shown, and as can be seen in Table I., the length of the period is influenced by the number of revolutions per minute and the number of magnet poles producing the magnetic field, and with an increase in the number of the latter the angle between the conductors for the tri-phase current becomes smaller. If we had, for instance, two machines of equal dimensions the one with two poles the other with six, the latter would have the same periods per second as the former when driven at one-third the speed. From practical experience it is found that the period should not exceed one-fiftieth second, that is, there should be at least 50 periods per second. The number of periods in an alternating-current machine is easy to calculate. If P equals the number of periods per second, n the revolutions per minute, p the number of pairs of magnet poles,

$P = \frac{n}{60} \times p$. For example, a dynamo has two poles, the revolutions are 3,000 per minute $\therefore p = 1\ n = 3{,}000$. $P = \frac{3{,}000}{60} \times 1 = 50$ periods per second.

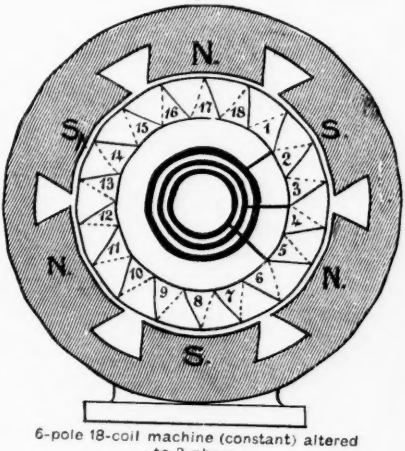
What will be the result of the proposed alterations of the ship's dynamos with respect to the periods per second obtainable? The mean

Fig. 25



4-pole 18-coil machine (constant) altered to 3-phase

Fig. 26



6-pole 18-coil machine (constant) altered to 3-phase.

Fig. 27

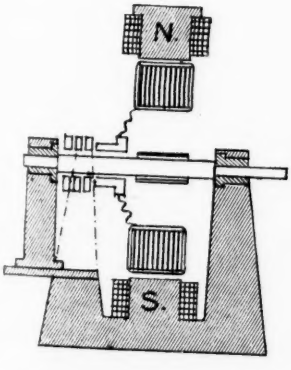
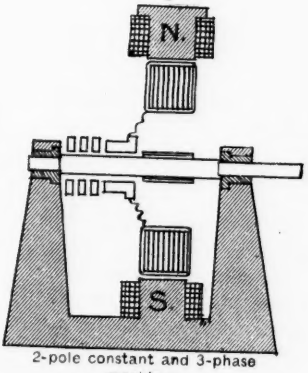


Fig. 28

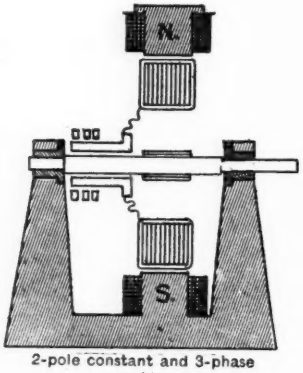


2-pole constant and 3-phase machine.

number of revolutions is about 450 per minute, and in the newer ships a slower speed of revolution still is arrived at. The number of magnet poles ranges from two to eight. We have then for $n_1 = \frac{n}{60} = 7{\cdot}5$ revolutions per second, and $p_1 = 1$, $p_2 = 2$, $p_3 = 3$, $p_4 = 4$, as the number of

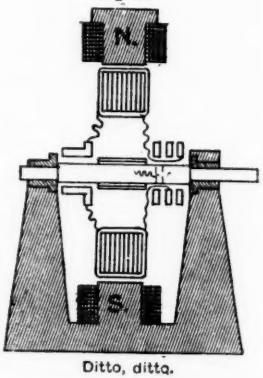
pairs of magnet poles, so that for the two-pole dynamo $P = 7{\cdot}5 \times 1 = 7{\cdot}5$, for four poles $P = 7{\cdot}5 \times 2 = 15$, six poles $P = 7{\cdot}5 \times 3 = 22{\cdot}5$, for eight poles $P = 7{\cdot}5 \times 4 = 30$ periods per second. If we would then obtain the minimum number of periods per second with the machines usually employed on board ship, either the number of revolutions must be increased or the number of magnet poles increased. In the first case, the number of revolutions for a two-pole machine must be 3,000 per minute, for four poles 1,500, for six 1,000, and for eight 750, and steam turbines

Fig. 29



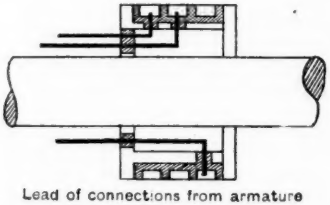
2-pole constant and 3-phase machine.

Fig. 30



Ditto, ditto.

Fig. 31



Lead of connections from armature to contact rings.

would be preferable to steam engines for driving the high-speed dynamos. In the other case, with a speed of 450 revolutions per minute, the machines would have twelve or fourteen poles, which would necessitate a large increase in their dimensions. These radical alterations are not within the limits of the proposals brought forward in this article. The number of periods available, therefore, range between $7\frac{1}{2}$ to 30 per second, and these are of the greatest importance for power transmission by the tri phase currents, as they at once determine the conditions of working and speed of revolution of the motors. Let us suppose we have a dynamo machine with six poles running at 450 revolutions per minute from which the tri-phase current is obtained, then the rotator of a synchronous motor will run at its maximum speed—1,350 revolutions per

minute—when its armature winding is so arranged that the primary current excites only two magnet poles at 180° apart, which, as already explained requires a whole revolution for each period. With asynchronous motors, and such motors alone come into the question for driving ventilators on board ship, when they are fitted directly on the ventilating fan shaft the number of revolutions unloaded is somewhat smaller. It varies with the load on the motor, but generally not more than from two to seven per cent. of the maximum. Now, by reason of the low number of periods per second in the primary machine, in this case $22\frac{1}{2}$, the secondary current in the rotator of the motor will be weaker than it would be if the periods were shorter and more numerous, since the maxima and minima of the primary follow each other at longer intervals. The variations in the revolutions of the rotator may, therefore, reach 10 per cent. of the full number. This weakening of the secondary current, however, will not be so considerable as to interfere with the starting of the motors, since a favourable condition of the projected employment of the tri-phase current for ventilators is that the load on the motor at starting is very small, and inconsiderable when running. If we wish to reduce the proposed number of revolutions of the asynchronous motor, 1,350 per minute, or, under unfavourable conditions, 1,200 per minute, it can be done by a suitable alteration of the armature grouping in the motor, or the so-called idle coils of the motor-winding. This must be done so that, in the place of two poles in the motor-winding, four, six, eight, etc., are formed, in which case the rotator will make 675, 439, 338, etc., revolutions per minute, neglecting the variations of 10 per cent. We see from what has been said that also in the motor the relation between the periods, poles, and revolutions holds good as in the generator, and with a given period in the primary current, and given number of magnet poles, the speed of rotation of the induced poles in the magnetic field, and, therefore, the number of revolutions per minute of the rotator of the motor, will be regulated. The foregoing observations lead to the conclusion that, with the alterations proposed in the ordinary machines on board ship, in spite of the low period of $7\frac{1}{2}$ to 30 per second, a speed of motor of from 100 to 1,350 revolutions per minute can be obtained, which is fully sufficient for ventilating fan installations. It is to be understood that the motor is on the same shaft as the fan, and, consequently, has the same speed of revolution. As regards the power of the secondary current in the rotator of the asynchronous motor, it is shown that this is very slightly affected by the low period of the primary. A current of $22\frac{1}{2}$ periods excites a secondary current in the rotator of the motor, which develops practically the same number of watts as that developed by a current having 50 periods per second. A transformer is not necessary for the tri-phase current, as the usual pressures on board ship of 65, 67, 74, and 110 volts are quite sufficient for the power installation, and, on account of the short distances, very little voltage is lost in the conductors. This loss can also be reduced to a minimum by choosing a central position for the primary machine.

The remaining part of Herr Chrapkowski's article deals with the particular arrangements of the generators and motors which would be

necessary or advisable on board the various classes of German war-ships. He lays stress on the necessity of separate generators and motors for the engine- and boiler-room ventilators, and maintains that the motors for the boiler-room fans should be placed above the protective deck, where they would be sheltered from the heat and coal dust, etc. He sums up the advantages of the three-phase motors of his system as follows :—

A.—As compared with Constant Current Motors.

1.—Absence of the commutators and their fittings.
2.—Saving in repairs, maintenance, and liability to accidents which these fittings entail.
3.—Saving in cost, time, material, and *personnel* which follow from 1 and 2.
4.—The driving current is led to the stationary instead of to the rotating part of the machine.
5.—Considerably greater reliability in working, can withstand overloading without injury, are always ready for use, and work at extraordinarily uniform speed.
6.—Greater simplicity in construction, especially in the case of a number of small motors.
7.—They occupy less space.
8.—Not affected by a change of polarity in the primary machine, as the sliding contacts admit of the rotator working in either direction.
9.—Less weight.
10.—Absolutely quiet in working, whilst there is a continuous hum with the direct-current motors.
11.—The unloaded current required is only 30 per cent. of that required for the full load.

B.—As compared with Alternate Current Motors.

1.—Fewer accessories required.
2.—More reliable in working, as they start in any position, and with heavy load.
3.—More uniform in speed.
4.—Less cost in installation and working. A 15-H.P. three-phase motor costs about the same as a 10-H.P. alternate current motor.
5.—Greater economy at small loads. The counter E.M.F. of the armature which increases with the speed tends to regulate the current at normal speed.

C.—As compared with Steam Motors.

1.—Noiseless and uniform motion.
2.—Smaller space required.
3.—Lighter.
4.—Smaller cost in installation, in working, and repairs.
5.—No steam pipes required.
6.—Do not heat the compartments where fitted.

7.—Greater security and readiness for use.
8.—No attention required.
9.—No repairs.
10.—Less lubricating material, self-lubricating.
11.—Cleanliness in motors and compartments.
12.—No smell.
13.—Accessibility.

DISADVANTAGES OF THE THREE-PHASE MOTORS.

A.—As compared with Direct-Current Motors.

1.—Three main conductors instead of two required.
2.—Speed not so easy of regulation.
3.—Greater variation in the circuit when switching the motors on and off, and which may amount to 25 per cent. Resistances are therefore necessary.
4.—Under certain conditions a loss of speed from decreased efficiency of the driving current.

B.—As compared with Alternate-Current Motors.

None.

C.—As compared with Steam Motors.

Less capacity for speed regulation.

In the foregoing I hope I have shown that the employment of three-phase currents for driving a certain part of the machinery of our war-ships possesses undoubted advantages over any other source of power, and I am of opinion that with the immense advances daily made in electrical science it will shortly become a question whether it would not be advisable to replace the continuous-current hitherto employed in our war-ships with the three-phase current; with an exception, perhaps, in the case of the search-light projectors. We certainly must not allow ourselves to be blinded by the results which electricity has obtained on land, and which are being daily added to, for the practical employment of electricity on land and on board ship are two fundamentally different things, as we often have opportunity for observing on board His Imperial Majesty's ships. Nearly all electrical installations on board ship suffer from faulty practical conditions. Experience in this field is still too limited, and installations and apparatus which certainly appear excellent on land, and without doubt also are, either fail utterly on board ship, or lose a great part of their value and efficiency. It is, therefore, a primary consideration, on which too much stress cannot possibly be laid, that electrical machines, apparatus, and fittings for employment on board ship be designed with the utmost care, be constructed with the highest class of workmanship and material in every detail, and be also installed on board with the same scrupulous care. Without the fulfilment of these conditions the employment of electrically driven machinery on board ship is not to be thought of, but with their fulfilment electricity promises to be a not inconsiderable factor in developing to the highest possible pitch of perfection the fighting efficiency of our ships of war.

GIBRALTAR.

By Major-General ALEXANDER B. TULLOCH, C.B., C.M.G.

THIS grand old Rock, which has stood fourteen sieges and been in the possession of Great Britain for nearly two hundred years, has lately become of even greater value to England than it was when it underwent its last siege of nearly four years; the closing scene of which was the repulse of forty-seven of the enemy's line-of-battle ships, the destruction of ten of their specially constructed floating batteries, and the silencing of the besiegers' heavy guns on the land side; and this by a garrison on the verge of starvation and with but ninety-six guns available for defence.

Owing to political changes and the increased size of the Fleet, another naval base besides Malta is absolutely necessary for us in the Mediterranean, and the position of Gibraltar at the mouth of the Straits and midway between England and Malta, answers the requirement exactly. The only drawback, however, is, that owing to the increased and increasing range of modern guns, the whole of the horseshoe-shaped bay, of which the rock forms one side, and which is only 5 to 6 miles across, may be covered by the fire of guns from the Spanish mainland. Ships lying alongside the breakwater and moles would be safe enough, and the docks would not come to much harm, were it not that a range of high ground on the north side of the bay, of which the highest point, 1,000 feet, known as the Queen of Spain's Chair, 5½ miles distant from the docks, looks into the whole of the new works; while the east and west spurs of the range coming down to the sea would give possibly slightly closer gun positions.

It will at once be asked, How was it that the west, or Spanish side, of the Rock was chosen for the dock, and not the east, which has only the open sea in front of it? Unfortunately, that side also is open to and within range of the eastern spurs of the ridge of hills already mentioned; there is no foreshore there suitable for reclamation on which to build machine shops, slips, and such like; the Rock on that side comes steeply down to the water's edge, and the whole of the works and breakwater would have to be built out in deep water; and last, but not least, eastern gales, having the whole sweep of the Mediterranean, send in a very heavy sea on that side, from which the western bay with its extensive anchorage is free.

With the engineering talent and appliances of the present day, the works now under construction might have been made on the east side of the Rock, but the additional expense would have been immense; and, balancing the respective advantages and disadvantages of both sides, an inspection of the sites at once shows that the naval and military

authorities were right in making the new harbour and docks on the west. A short account of the works now in progress will, possibly, be interesting not only to professionals, but also to the tax-payers at home, who have to find the £4,000,000 which the harbour, docks, etc., will cost before they are finished.

Although the necessity for naval docks and a refitting establishment at Gibraltar have been under consideration for sometime, nothing was done until 1895, but in the following year the deep-water foundations of the moles and breakwater were commenced, and the plant for the great concrete block factory laid down by the Admiralty engineers. Two years ago the completion of the harbour works and the construction of the docks were let to the well-known contractors, Topham, Jones & Railton, who will require four years more to finish everything.

The general scheme can be simply explained by stating that it consists of an extension of the naval or south mole, towards the north-west, to a total length of 3,500 feet, and the old commercial mole on the north, in a westerly direction to a total length of 2,790 feet, the space between the ends of the respective moles being filled in by an intermediate breakwater, 2,700 feet long, and an arm at right-angles to the new end of the old mole 1,500 feet in length, the width of the openings at each end of the intermediate breakwater being respectively 600 and 650 feet. The moles and breakwater enclose a sheltered anchorage, triangular in shape, about a mile and a half in length, and half a mile in breadth at the base, which is formed by the old mole and its extension; the apex of the triangle is formed by the entrance to the docks at the inner extremity of the south or naval mole, the old line wall of rampart and parapet forming an almost straight line on the land side from the docks to the inner extremity of the old or north mole.

The anchorage space will be as follows:—70 acres, with a depth of 35 feet; 33 acres, with 33 feet; 150 acres, with 30 feet; and about 55 acres, with from 20 to 30 feet. The depth of water along 2,600 feet of the inner side of the new mole, the intermediate breakwater and old mole being 35 feet; the arm will have 30 feet. All this is exclusive of an immense space of shallow water closer inshore, which could be dredged if required.

From the inner side of the new portion of the old mole, five jetties, 300 feet long and 75 feet broad, will be built, and large covered sheds for coals will be placed on the mole and also on the arm, where commercial coal will be stored, and the present hulks in the outer anchorage got rid of. Naval coal-sheds will also occupy nearly the whole of the south mole, but a glance at the breadth of the mole shows that it could not hold sufficient, and more coal space for naval requirements will have to be found.

With the exception of the arm at right-angles to the north mole, and a very small portion of the end of the south mole, the whole of the moles and breakwater are all above water, the new mole with the exception of about 200 yards at the end being finished and ready for ships to lie alongside, as is also a considerable length of the centre of the intermediate

breakwater. It will take another year and a half to finish the arm of the north mole, but another twelve months should see the moles and breakwater completed, all with their broad roadways and thick stone parapets.

The docks will be three in number, the largest divisable into two will be 850 feet long, the second 550, and the third 450; with a width of 120 feet in each case, and a depth of 35 feet on the sill at low water. The necessary space for them has been found by cutting off 100 yards of the parade ground by the south mole and banking out the sea. As yet only a portion, about a quarter of the largest dock, where the parade ground formerly was, has been excavated, but the concrete backing for the masonry is already in its place; the excavation of the smallest dock, only commenced six months ago, is already down to the lowest level, but the intermediate dock and the outer portion of the large dock cannot be commenced until the dam cutting off the sea from the intended outer extremity of the docks is completed; this will take another six months.

On the outside of the docks along the foot of the old water-line of the fortification wall a space of foreshore about 500 yards by 150 yards has already been nearly filled in, and on this strongly built sheds for machine shops and repairing establishments have been commenced. Torpedo-boat slips and boat cambers, in continuation of this filled-in shore extending to the ragged staff landing-place, are rapidly approaching completion. All these great works are being carried out by some four thousand Spanish, Maltese, Italian, and even French, workmen, the great bulk being Spanish, with comparatively few British foremen to supervise them; these men give no trouble whatever, and do their work with wonderful intelligence. About fifty of them have learnt to be divers. The pay of an ordinary labourer is $2\frac{3}{4}$ pesetas (about 1s. 6d. English) per day, of eight hours in the winter and ten in the summer; the divers, superior workmen, masons, etc., are, of course, more highly paid.

Some months ago a few socialists from Barcelona brought about a strike, which lasted a fortnight, but at the end of that time so many men had tramped down from different parts of Spain to get the good wages obtainable at Gibraltar that the strike came to an end. The workmen live outside Gibraltar at the Spanish lines and San Roque, walking in and out daily. The works are an enormous boon to the hard-working and poorly-paid peasant of the south of Spain. A considerable amount is said to be sent by these bread-winners to their families living as far north as the Pyrenees.

When testing the ground at the head of the large dock a curious incident was noticed. Below the limestone breccia the borer passed through dark-coloured shale, and when at a depth of 60 feet—that is, 10 feet below the present bottom of the dock—a rush of inflammable gas came up. Geologists could probably at once give some explanation; but as petroleum has been found in the south-east of Spain, it seems a pity the experiment of a little deeper boring was not tried.

The dredgers working over the places where the battering-ships were burnt and sunk might have been expected to bring up some interesting

relics of the last great fight, but as yet only about 4 feet of the muzzle of one of the heavy brass 32-pounders with which they were armed has been found; it has the word "Trabersa" on the chase. The sea bottom, however, is liberally sprinkled with old round shot and unexploded mortar shells, doubtless fired by the garrison.

Of the present defences of Gibraltar it will not do to say more than can be seen by anyone walking along the public road and in the beautiful well-cared-for Alameda gardens. As the heavily-plated casemate batteries along the line wall and in the gardens could not be used with the ships in the new harbour right in front of them, the 18- and 38-ton M.L. guns have been removed and sent home, or otherwise disposed of. The new batteries are all half-way up the Rock and even on the top of it; they are armed with the newest type of heavy breech-loaders and very heavy howitzers, making the old Rock more unassailable than ever. Possibly the armament may be increased by guns in cupolas on the round extremities of the moles and breakwater. The old galleries on the north and north-west front are ready-made casemates for howitzers, to keep down fire from sheltered guns on the high ground already mentioned, which enfilades the sea front. Ships of the "Devastation" class, with an unlimited supply of ammunition close at hand, might also assist in this by going round to the east of the Rock and taking the high ground in flank. When the tremendous fire which could be brought to bear from new pattern guns and howitzers in the upper galleries, 600 and 700 feet above the ground and along the crest line, 1,000 to 1,300 feet high, of the north front, 1½ miles in advance of the dockyard, is considered, the danger which at first sight seems to menace the new harbour from the heights of the Queen of Spain's Chair practically disappears.

Hostilities with a country in which we have so many commercial interests in common seems almost impossible. The Spaniards, although their official history is more amusing than correct, also have good memories, and know that in modern times it was only when unfortunate political events forced Spain into alliances against us that we have been opposed to a nation with which there is every reason to hope we shall always be on the same cordial terms as during the Peninsular War, when for seven years we poured out our best blood, and incurred the heavy debt, with which we are still heavily encumbered, in order to help Spain to drive out the armies of that terrible genius who conquered the rest of Europe, but met his match in the Peninsula.

Note.—Since this paper was written in December last, several sensational statements and diagrams have appeared in English newspapers showing Spanish batteries on the mainland, which could destroy the docks and shipping. It may be some consolation to know that these batteries exist in imagination only, and, if ever constructed on the sites mentioned, could be easily silenced from the Rock.—A. B. T.

NAVAL NOTES.

HOME.—The following are the principal appointments which have been made :—Rear-Admiral—H. T. Grenfell, C.M.G., to be Second-in-Command of Reserve Squadron during the forthcoming cruise. Captains—J. de C. Hamilton to "Defiance"; F. T. Fegen to "Severn"; H. G. King-Hall, D.S.O., as Divisional Transport Officer at Durban; H. N. Dudding to "Galatea"; A. L. Winsloe to "Ophir"; A. J. Pocklington to "Sans Pareil"; P. W. Bush to "St. George"; M. H. Smyth to "Rambler"; the Hon. A. E. Bethell to "Naiad." Commanders—C. E. Tower to "Harrier"; J. B. Eustace to "Alert"; E. M. C. Cooper-Key to "Edinburgh"; F. A. Garforth to "Hotspur."

Commodore A. L. Winsloe commissioned the "Ophir" at Tilbury on the 26th ult. as temporary yacht for the conveyance of T.R.H. the Duke and Duchess of Cornwall and York on their tour to Australia and other Colonies; she has arrived at Portsmouth, and, according to present arrangements, their Royal Highnesses embark on the 16th inst., the "Ophir" leaving for Gibraltar the same evening, escorted by the first-class cruisers "Diadem" and "Niobe." The cruisers "St. George" and "Juno" have left for Suez, where they will join the "Ophir" on her arrival and take up the duty of permanent escort to the ship during the rest of the cruise.

The official programme giving the approximate dates on which the Duke and Duchess of Cornwall and York will reach the various places they will visit during their tour has been issued, and is as follows :—

Leave	*Arrive*
Portsmouth, 16th March.	Gibraltar, 20th March.
Gibraltar, 22nd March.	Malta, 25th March.
Malta, 27th March.	Port Said, 30th March.
Port Said, 31st March.	Suez, 1st April.
Suez, 1st April.	Aden, 5th April.
Aden, 6th April.	Colombo, 12th April.
Colombo, 16th April.	Singapore, 21st April.
Singapore, 23rd April.	Melbourne, 6th May.
Melbourne, 16th May.	Brisbane, 20th May.
Brisbane, 25th May.	Sydney, 27th May.
Sydney, 6th June.	Auckland, 11th June.
Auckland, 16th June.	Wellington, 18th June.
Wellington, 21st June.	Lyttleton, 22nd June.
Lyttleton, 24th June.	Dunedin, 25th June.
Dunedin, 27th June.	Hobart, 2nd July.
Hobart, 7th July.	Adelaide, 10th July.
Adelaide, 15th July.	Fremantle, 20th July.
Fremantle, 25th July.	Mauritius, 5th August.
Mauritius, 8th August.	Durban, 13th August.
Durban, 15th August.	Simonstown, 17th August.
Cape Town, 22nd August.	Ascension, 27th August.
Ascension, 31st August.	Off St. Vincent, 5th September.
St. Vincent, 5th September.	Halifax, 15th September.
Halifax, 17th September.	Quebec, 20th September.
Quebec, 17th October.	St. John's, 22nd October.
St. John's, 25th October.	Portsmouth, 1st November.

Rear-Admiral E. Jeffreys took over the command at Queenstown on the 1st inst. The Reserve Squadron has been assembled for the second quarterly cruise, under the command of Rear-Admiral Sir G. Noel, K.C.M.G.; Rear-Admiral H. T. Grenfell, C.M.G., has been appointed Second-in-Command during the cruise, and hoisted his flag on the 2nd inst. on board the first-class battle-ship "Sans Pareil" on the termination of the cruise.

The second-class cruiser "Terpsichore" commissioned at Chatham on the 7th ult. to take the place, on the Cape station, of the wrecked "Sybille"; she left on the 23rd ult.

for her station. The second-class cruiser "Venus" arrived at Plymouth on the 11th ult. from the Mediterranean, and she has arrived at Chatham, where she will pay off. The third-class cruiser "Phœbe" commissioned at Devonport on the 19th ult. for the Australian station, where she relieves a smaller vessel, the third-class cruiser "Mohawk." The first-class cruiser "Blake" left Plymouth on the 20th ult. for Sydney with the new crew for the "Royal Arthur," which will re-commission as flag-ship on the Australian station. The first-class battle-ship "Hood" left Plymouth on the 23rd ult. for the Mediterranean, where she temporarily takes the place of the "Oran," ordered to China.

The Navy Estimates.—The following is the statement of the First Lord of the Admiralty, explanatory of the Navy Estimates, 1901-1902, presented to Parliament :—

The Navy Estimates for 1901-1902 amount to a net total of £30,875,500, being an increase of £2,083,600 beyond the amount of £28,791,900 voted for the year 1900-1901.

The Manning Vote (Vote 1) shows an increase of £233,000, due in the main to the increased number of men last year and this year.

Vote 8, shipbuilding, etc., shows a net increase of £1,274,900.

Vote 9, armaments, is increased by £161,800.

Vote 10, works, is increased by £137,300.

The remaining Votes show a net increase of £276,600.

The comparison in every case is with the original Estimates of 1900-1901 plus the additional Estimates voted in July, 1900.

NUMBERS.

The total number of officers, seamen, and boys, Coast Guard, and Royal Marines proposed for the year 1901-1902 is 118,635, being an increase of 3,745.

The additions proposed are to meet the needs of the Fleet, and are made up of :—

287 officers.
1,150 seamen.
500 stokers.
398 miscellaneous.
310 artisans (including 100 electricians).
1,000 marines.
100 apprentices (shipwrights and coopers).

MOBILISATION.

The plans for strengthening and developing the system of Reserves, referred to in last year's Statement as under consideration, have been given effect to by the passing of an Act of Parliament to establish a new Reserve force, to be called the Royal Fleet Reserve. It will consist partly of men who have served in the Navy or Royal Marines and left without taking pension (Class B), and partly of men who have been pensioned (Class A). The Seaman Pensioner Reserve will be superseded eventually by the new Royal Fleet Reserve, but the present Royal Naval Reserve is not affected.

The first entries in the new force will be made from 1st March of this year ; and it is hoped to eventually raise the numbers of Class B to 15,000. The men in the new Royal Fleet Reserve will undergo periodical drill.

In order further to facilitate mobilisation another Act of Parliament was also passed, enabling the Admiralty, when the Royal Naval Reserve is called by Royal Proclamation into actual service, to limit the numbers to be called out to such as may from time to time appear desirable.

The Coast Guard and Port Guard ships, which heretofore have had only a portion of their crews on board, are now kept fully manned. An additional Coast Guard ship has been commissioned and established at Rathmullen, in Ireland.

The Royal Marines.

2,630 recruits were raised for the Corps during the year 1900, the artillery branch receiving 616 of this number, the remainder going to the infantry divisions.

For the artillery branch the mean height was 5 feet 8 inches, for the infantry 5 feet 6 inches.

The twelve months produced a wastage of 2,165, the largest for some years. More than half of this number were men time expired, pensioned, purchased, and invalided, most of whom will be eligible for entry in the new Reserve, and will probably join it.

During the past year directions have been given for the training in gunnery of the young officers, Royal Marine Light Infantry, to take place in the Gunnery School at Whale Island instead of at their divisional headquarters, in the same manner as the young officers, Royal Marine Artillery, whereby uniformity of instruction is ensured.

A fuller recognition has been made of the eligibility of Marines for employment as captains of guns in H.M. ships. A proportion of Marine captains of guns will in future be allowed in the complements of all battle-ships and such first-class cruisers as are flag-ships; and a new auxiliary rating of second captain of gun has been established by Order in Council for men of the Marine Infantry, with an additional allowance of one penny per diem while borne on ships' books for the duty.

Musketry.—Twenty per cent. of the men on shore qualified as marksmen, 75 per cent. reaching the next stage of efficiency.

Reserve of Officers.—During the past year attention was directed to the fact that no specific regulation existed under which retired Marine officers could be recalled for service in case of emergency. A scheme has been prepared for the creation of a "Reserve of Officers, Royal Marines." It makes all officers who voluntarily retire liable to serve in this Reserve, those already on the retired list or who may be retired compulsorily having the option of joining if under 50.

Reserve of Men.—Taking advantage of the powers given to the Admiralty by the Naval Reserve Act of 1900, to raise and keep up a new division of reserves in addition to the men already authorised under the Act of 1859, steps were taken to incorporate in the new force a Reserve of Royal Marines, and the raising of this Reserve is now in course of operation.

Naval Reserves.

Executive Officers.—The establishment is fixed at 1,500, and there are now borne 436 lieutenants, 517 sub-lieutenants, and 547 midshipmen. Vacancies for executive officers are filled up as soon as they occur. There are no vacancies at present, and 330 qualified candidates are on the list of applicants for appointment.

The total number of executive officers now on the active list, who have served for 12 months or more in the Navy, or are now undergoing 12 months' training, is 295, an increase of 28 since last year.

Engineers.—The establishment of engineer officers is fixed at 400 and is complete. There are 15 candidates on the list of applicants for appointments.

The instructional courses for engineers in the home dockyards, commenced in 1898, have been continued. Three courses of 6 officers have been held each year, and arrangements are now being made to increase the number to 18 officers for each course, or a total of 54 per annum; 32 officers have been through the courses, and they have been satisfactorily reported on for conduct and attention. These officers appreciate the instruction and experience afforded.

Seamen.—On 31st December last the total number of seamen borne, as compared with the numbers voted, was :—

Class.	Number Voted. 1900-1.	Numbers Borne.	
		31.12.00.	31.12.99.
Qualified Seamen	11,700	2,937	2,080
First-class, old system		7,978	8,921
Seamen	11,300	4,218	3,406
Second-class, old system		5,996	7,555
Totals	23,000	21,129	21,962

	1900.	1899.
Numbers embarked for 6 months' naval training	784	980

The falling off in numbers borne and in those embarking for naval training is attributed to the unpopularity of this compulsory training owing to insufficient pay as compared with what the men earn at their proper vocations (fishing, yachting, merchant-ships, etc.), and the length of time required to serve, which interferes with their employment. Arrangements are being made to re-adjust the pay and to reduce the period of training from 6 to 3 months, which it is hoped will induce more men to embark. Further, this embarkation will not be compulsory, except as regards earning promotion and future pension, and men who do not qualify for promotion to "qualified seamen" will be allowed to re-enrol as "seamen" for a second and third period of 5 years, which at present is not allowed. We regret this unavoidable diminution of the training period; but it is believed that a re-adjustment of the system of instruction will go far to neutralise the loss of time.

The negotiations for the establishment of a branch of the Royal Naval Reserve in the North American colonies, to which reference was made in last year's statement, have been proceeded with, and 50 seamen from Newfoundland have been embarked in His Majesty's ships on the station for 6 months' training.

Firemen.—During the year 1900 there were 337 firemen enrolled as compared with 544 in 1899, being a decrease of 207.

The numbers borne as compared with the numbers voted are:—

Borne, 31st December, 1900	...	3,530	Voted	...	3,600
" " 1899	...	3,494	"	...	3,500

Drill-Ships and Batteries.—The process of replacing the old M.L. guns by modern Q.F. guns is being continued, and arrangements are in hand to supply several 5-inch B.L. (converted to Q.F.) and Maxim guns during the forthcoming financial year.

Changes in Composition of Fleets.

China.—The China Fleet has been considerably increased during the past 12 months. The "Dido," "Isis," and "Astræa" from the Mediterranean, the "Arethusa" from the Pacific, the "Wallaroo," "Mohawk," and "Lizard" from Australia, and the "Marathon" from the East Indies were all sent to that station during the disturbances last year for temporary service. Of these, the "Marathon" has returned to her station, the "Dido" and "Isis" have been replaced by other cruisers in the Mediterranean, and will remain in China; the "Mohawk" has been replaced in Australia, and is now returning home. The "Glory," "Argonaut," and 2 destroyers ("Otter" and "Janus" have been added to the Fleet in Chinese waters, and the "Ocean" left Malta 2nd February to join them. The "Robin," river gun-boat, has been commissioned for service in the West River, and the steamer "Pioneer" has been purchased and will be fitted as a gun-boat for service on the Yang-tse Kiang.

Mediterranean.—Eight destroyers and four first-class torpedo-boats have been added to the Mediterranean Fleet. The "Hood" has replaced the "Ocean" sent to China.

Home.—A torpedo-gunboat (fitted with water-tube boilers) has been attached to each home port for the instruction of engine-room ratings in water-tube boilers.

The additions to the sea-going Fleet in Commission, enumerated above, involved complements to the extent of 7,269 officers and men.

It is worthy of note that these ships have been commissioned without reducing the *personnel* at home below the strength required for mobilisation of the ships in reserve, without any interruption or diminution of the work of the various schools and training establishments, and without drawing upon any of the Naval Reserve forces. The ordinary reliefs on foreign stations, which were due during the latter portion of the year 1900, had unavoidably to be delayed, but are all now either being or about to be carried out.

Naval Brigades.—All Naval Brigades serving on shore in South Africa had returned to their ships by October, 1900.

A Naval Brigade participated in the International advance to Pekin, and, on the occupation of the city, returned to their ships.

The Government of South Australia offered the services of the South Australian gun-boat "Protector" for service in China during the disturbances of last year. The offer was accepted for four months, and the "Protector" served in China from September till the end of November. The Commander-in-Chief reported that the "Protector" was most useful, being an efficient and well-kept man-of-war, reflecting credit on captain, officers, and men.

The Governments of New South Wales and Victoria similarly offered the services of Colonial Naval Brigades, consisting respectively of 300 and 200 officers and men for service in China. These offers were accepted, and the brigades have been employed on shore under the General, where they did good service. They will return home by the end of March.

Losses.—The second-class cruiser "Sybille" went ashore at Lambert's Bay, in Cape Colony, on 16th January, and is reported to be a total wreck. One life was lost. The report of the court-martial has not yet arrived. The "Hind," Coast Guard cruiser, was wrecked on the East Coast of England in November. No lives were lost. The river gun-boat "Sandpiper" sank during a typhoon at Hong-Kong in November, but was successfully raised. One life was lost.

Manœuvres.—The annual manœuvres took place, 49 ships and torpedo-boats being specially commissioned for the purpose. Altogether 115 ships and vessels took part in the manœuvres, and over 30,0000 officers and men. The total number of Coast Guard embarked was 45 officers and 1,711 men, and of Royal Naval Reserves 35 officers and 390 men.

Coaling of the Fleet.

In order to facilitate the departmental administration of this service a slight change has been made in the Navy Estimates, whereby all incidental expenses, including craft, machinery, etc., are provided for under the same sub-head as the cost of the coal and its conveyance (Vote 8, Section 2, Sub-head K). The works and buildings connected with coaling have also been grouped in one sub-head of Vote 10.

Steps are in progress to organise and improve the coaling facilities at the several naval stations to ensure that the requirements of the fleets can at all times be amply met. It is proposed to include the provision for the necessary expenditure in the forthcoming Naval Works Loan Bill.

Additions have been made to the coaling craft, and provision is included in the Estimates for 1901-2 for further floating craft to be equipped with modern appliances. Provision is also made for the increase of reserve stocks of coal at certain naval stations abroad. The supervision of coaling duties at certain of the naval depôts has been strengthened.

The system of supplying coal to fleets and naval stations by colliers under Admiralty control or under the orders of the Commanders-in-Chief is working well, and will be extended as far as circumstances permit.

The experiments with patent fuel have been satisfactorily concluded, and suitable quantities will be stored to form adequate reserves at foreign stations.

Schemes for further trials with liquid fuel have been considered, and some manufacturers have undertaken to submit designs and particulars of trials. Two of these plans are about to be tried, one with a marine water-tube boiler on shore, and one, if the arrangements are suitable, on board H.M.S. "Surly."

Naval Training.

The training of officers and men has received and is receiving much attention from the Board.

The report of a committee on the Training and Examination of Junior Officers, which was appoined in 1897, and the circular in which its recommendations have been embodied and issued to the Fleet, will be laid before Parliament. Sufficient time has not elapsed to show the result of the changes introduced, but any modifications shown to be necessary by experience will be adopted.

Special encouragement is being given to the better study of foreign languages; the seamanship examination has been revised by the Council of Education to meet the present conditions obtaining on modern war-ships; promotion to the rank of lieutenant will not in future depend only upon success in examinations, but a certificate will be required to be obtained by every sub-lieutenant from his commanding officer after six months' service in a ship of war at sea as to his fitness to take charge of a watch at sea and to perform efficiently his other duties as a lieutenant.

A naval strategy course, including therein strategy, tactics, naval history, and international law, has been commenced at Greenwich for the benefit of the senior officers at the Royal Naval College, and is being conducted by the captain of the college. The tactical courses at Portsmouth are being continued. All the officers going through these courses have been placed on full pay.

The Council of Naval Education has been directed to carefully scrutinise the Greenwich course with a view to ascertaining whether the matter and period of study of the gunnery and torpedo lieutenants is that most adapted to the efficiency of the Service.

The system of training the men of the Navy is being constantly watched and revised with a view to increased efficiency. Great stress is being laid on efficiency in coaling; special arrangements have been made for training the stokers in the depôts in the stoking of water-tube boilers; a scheme has been matured, and is now under consideration, for transferring a large proportion of the instruction in gunnery from the gunnery schools to the seagoing fleet, and for confining the further education in the gunnery schools to those seamen who show special aptitude, and who may therefore, be selected for the advanced ratings of captains of guns and captains of turrets, or for the higher torpedo ratings. There is no doubt but that the standard of proficiency in gunnery is steadily rising in the Navy. A large addition of practice ammunition for the fleet was sanctioned in 1899, and a seagoing gunnery ship has been allotted to each of the gunnery schools, and will be attached as soon as ready.

New Construction.

There has been no relaxation of activity in shipbuilding and engineering operations generally during the past year, better progress having been made than in recent years with the ships under construction for the Royal Navy, and it is anticipated that the aggregate expenditure on new construction will closely approach the provision made in the Estimates, and will largely exceed that of any previous year.

The steps taken by the various contractors to increase the output of armour and machinery have begun to show their effect, and the rate of progress has greatly increased during the latter half of the year. This is especially the case with armour, the total output of which for Admiralty use in the present year will be from 45 to 50 per cent. greater than last year. The rate of delivery during the latter half of this year indicates that the new plant is now in effective working order. Moreover, a fifth firm has undertaken armour manufacture, and has advanced considerably with the necessary plant. The outlook in regard to the future supply of armour is, therefore, favourable.

The total output of new construction in the financial year now drawing to a close will probably exceed that of 1899-1900, which was previously the greatest on record, by about 1,000,000.

Battle-ships.

The "Glory" has been completed and commissioned. The "Albion" has been delivered, and has commenced her trials, but I regret to say that defects in her machinery have been discovered which have postponed her completion.

The "Vengeance," the last ship of the "Canopus" class, has been detained at Barrow in consequence of an accident to the entrance of the dock in which the ship was being completed. It is now reported that the works on the dock entrance are being rapidly pushed forward, and that they will probably be sufficiently advanced to permit the ship to pass out during April. Her trials and completion will be accelerated as much as possible after delivery.

The six battle-ships of the "Formidable" class, which were in hand in the dockyards at the beginning of the present financial year, have been considerably advanced, and two similar ships (the "Queen" and "Prince of Wales") have been commenced. The "Implacable" has commenced her steam trials, and will be practically completed by the end of the financial year; her gunnery trials will probably be made rather later. It is anticipated that the "Formidable" and "Irresistible" will be completed early in the next financial year, and the "Bulwark" about December next. The "London" and "Venerable" will probably be finished about May, 1902.

The six vessels of the "Duncan" class have also been well advanced. Of the four building by contract, the "Russell" has been launched and the "Duncan" will be launched on 21st March, and the other two are very nearly in the same stage of progress. The "Albemarle" and "Montagu," building in the dockyards, are to be launched on 5th March. All these vessels should be completed in 1902-3.

Armoured Cruisers.

Twenty vessels are now in course of construction; six of the "Cressy" class, four of the "Drake" class, and ten of the "Monmouth" class.

The "Cressy" has been delivered within the contract date, and has satisfactorily completed her steam trials, exceeding her estimated maximum speed by nearly half a knot.

Satisfactory preliminary trials have been made with the new type of mounting for her 9·2-inch guns, and the ship is now being prepared for service. Her gunnery trials will be carried out early in the next financial year.

The "Sutlej" has been delivered and the "Aboukir" will be delivered during the present financial year. Both ships will be made ready for trials immediately.

The completion of the "Hogue" at Barrow has been delayed by the same accident that has affected the delivery of the "Vengeance." The contractors are now making special arrangements to press forward the work on the ship.

The "Bacchante" has been launched, and the "Euryalus" is the only vessel of the class remaining on the building slips. Her launch has been deferred in consequence of the accident to the dock entrance at Barrow.

One vessel of the "Drake" class (the "Good Hope") has been launched, and the "Drake" is to be launched before the present financial year closes. Equally satisfactory progress has not been made hitherto on the other two vessels of this class building by contract, but the contractors have been urged to make greater efforts, and have undertaken to do so.

Four of the vessels of the "Monmouth" class which were commenced last year have been considerably advanced. The first of these (the "Kent") will have been launched before the close of this financial year, and two others will probably be launched about May next, and the fourth about August.

The remaining six vessels have been commenced recently and the work on them will be advanced, before the present financial year closes, to a stage which will enable rapid progress to be made on them next year.

It will be seen from the above that four battle-ships and four armoured cruisers are expected to be launched during the last two months of this financial year.

Protected Cruisers.

The contractors' steam trials of the first-class cruiser "Spartiate" were not satisfactory, and the completion of the ship has been delayed by the necessity for replacing a condemned crank shaft.

The two second-class cruisers of improved "Hermes" type ("Challenger," and "Encounter") referred to in the statement of last year have been commenced in the dockyards. They are not sheathed with wood and copper, and are about a knot faster than the "Hermes" class. One of these vessels is to be fitted with Babcock and Wilcox boilers.

Only one third-class cruiser (the "Pandora") has been in hand during the year. Her steam trials have still to be completed, but it is anticipated she will be practically ready for service at the close of the present financial year.

Sloops and Gun-boats.

Eight sloops have been under construction during the year, six in the dockyards and two by contract. The delivery of the latter has been considerably delayed, and they will not be completed, as was anticipated, this financial year. Two of the dockyard-built vessels will be completed this year, and two others will be finished next summer, when the contract-built ships should then be finished.

The remaining two vessels ("Odin" and "Merlin") have been commenced at Sheerness during the present year.

Two gun-boats of extremely light draught (the "Teal" and "Moorhen") have been begun this year, and are now well advanced. The work has been hindered by difficulties with material for boiler tubes, but it is anticipated that the vessels will be finished early in the next financial year.

Torpedo-boat Destroyers.

The total number of vessels in this class is now 113. Forty-two have trial speeds of 26 to 27 knots, and the whole of these have been completed and accepted. Four of this type, which were originally completed with locomotive boilers, have now been fitted with water-tube boilers, and the whole of the 113 torpedo-boat destroyers now have water-tube boilers of the small tube or "Express" type.

Of the 30-knot vessels, 58 have been delivered, of which two have not yet passed their trials, and the eight still remaining in the builders' hands are well advanced, one having passed her official trials, and two others being now under trial.

Of the five destroyers with trial speeds of over 30 knots two have been delivered and have completed their trials, viz., the "Albatross," which attained 31½ knots speed on trial, and the "Viper," fitted with Parsons' Steam Turbine, which attained on trial a speed of over 33¾ knots, combined with an almost entire absence of vibration. The "Cobra," which has similar machinery to that in the "Viper," was tried with a load on board largely in excess of that usually carried on speed trials by destroyers, and maintained for three hours a speed slightly above 30 knots.

A fourth vessel, of 32 knots speed, is expected to commence her preliminary steam trials about June next.

The fifth vessel (of 33 knots contract speed) has undergone a very long series of trials with propellers of varying dimensions, but the builders have not up to the present succeeded in attaining the guaranteed speed, and consequent delay in completion has resulted.

At the close of this financial year there will be 10 destroyers ordered previously to 1900-1901 still undelivered, but five additional vessels, not included in the original Estimates for the year, were purchased under an additional Estimate while in course of construction, and these will be delivered this financial year.

Torpedo-boats.

The two torpedo-boats of 25 knots trial speed, ordered in 1899, are well advanced. The first will shortly commence her preliminary trials. The further two of the same type ordered this year are also well advanced, and it is expected that all four will have been delivered and tried by September next.

Royal Yacht.

The alterations in this vessel which were mentioned as necessary in last year's statement have been made, and she has satisfactorily completed her steam trials during the year. These trials included three of 48 hours each, one at 5,000-H.P., and two at 7,500-H.P.; and one trial of 8 hours at 11,000-H.P. All the trials were carried out with complete success, the engines working with great smoothness and an almost complete absence of vibration. The maximum speed obtained was 20½ knots, instead of the 20

knots promised in the design; and on two occasions the vessel ran at a speed of about 18½ knots for 48 hours continuously.

Experiments made since the alterations show that the vessel will have ample stability, and her behaviour during her trials when experiencing a very strong breeze and considerable sea was very satisfactory.

The work of completing her internal decoration and fittings is now in hand.

Fleet Auxiliaries.

The provision of fleet auxiliaries is under the careful consideration of the Board. Three colliers are now working with the Fleet; a repairing and distilling-ship has been purchased and is now being fitted up; provision is made in the Estimates for another distilling-ship and for a depôt-ship, while it is expected that the "Maine" will, with the kind assistance of the Committee of American ladies and the owner, be secured for service as a hospital-ship in the Mediterranean during the ensuing summer.

Royal Naval Reserved Merchant-Cruisers.

During the year a new arrangement has been made with nearly all the great steamship companies, by which their finest vessels are held at the disposition of the Admiralty for employment as armed cruisers when required. Under the previous agreements only the Cunard, White Star, Penisular and Oriental, and Canadian Pacific Railway Companies were included. To these have now been added the Orient, Royal Mail, and Pacific Companies. Eighteen of the largest and swiftest passenger steamers belonging to these companies will receive an annual subvention, and thirty steamers in addition are held at the disposition of the Admiralty without further subsidy. In the main features the new agreements will be similiar to former agreements, but in some particulars modifications have been made based on experience.

Experiments.

During the year a number of experiments have been made on armour plates with a view to improvements in manufacture, or to the selection of the quality of armour best adapted for particular services.

An important firing trial was also carried out against H.M.S. "Belleisle," and much valuable information was obtained which will be of service in future naval construction.

Submarine Boats.

Five submarine vessels of the type invented by Mr. Holland have been ordered, the first of which should be delivered next autumn.

What the future value of these boats may be in naval warfare can only be a matter of conjecture. The experiments with these boats will assist the Admiralty in assessing their true value. The question of their employment must be studied, and all developments in their mechanism carefully watched by this country.

MACHINERY AND BOILERS.

Between the preparation of last year's statement and 31st March, 1900, the battleship "Glory" and the sloop "Condor" completed their contractors' trials, and the former vessel is now on the China station.

The following vessels have completed their contract steam trials during the present financial year:—

First-class cruiser—"Cressy." Sloops—"Vestal" and "Shearwater." Torpedo-boat destroyers—16 in number. Royal yacht—"Victoria and Albert."

In addition, the battle-ships "Albion," "Implacable," the first-class cruiser "Spartiate," the third-class cruiser "Pandora," the sloop "Mutine," and four torpedo-boat destroyers have commenced their trials.

The battle-ships "Bulwark" and "Formidable" and armoured cruiser "Sutlej" will be ready for trials early in the next financial year.

The third-class cruiser "Blanche" has been reboilered, the double-ended cylindrical boilers being replaced by water-tube-boilers of the small-tube type. She has com-

pleted her trials satisfactorily, and is now on foreign service. The sister vessel "Blonde" is now in hand for similar alterations.

The torpedo-gunboats "Niger" and "Gossamer" are being re-engined and reboilered with small-tube water-tube boilers, associated with light quick-running engines.

This is following on a similar course to that adopted last year with "Skipjack" and "Speedwell," and provides an increase in the I.H.P. developed in the vessels from 3,500 to 6,000.

The torpedo-boat destroyers "Havock," "Hasty," and "Charger" have had their locomotive boilers replaced by small-tube water-tube boilers, and the "Havock" has satisfactorily completed her trials with the new boilers.

The torpedo-gunboat "Seagull," recently fitted with water-tube boilers, of the Niclausse type, has satisfactorily completed an exhaustive series of sea-going trials similar to those carried out in the "Sharpshooter" (Belleville) and "Sheldrake" (Babcock & Wilcox) during the preceding year.

These comparative trials in three similar ships have furnished valuable information regarding the different types of boilers; and as a result it has been decided to continue them on a larger scale, and boilers of the Babcock & Wilcox pattern have accordingly been ordered for the new second-class cruiser "Challenger" and the sloop "Odin"; the sloop "Espiegle" was ordered to be fitted with these boilers in 1899-1900, and she will be ready to commence her steam trials early in the ensuing financial year; and Niclausse boilers are to be fitted in the first-class cruiser "Suffolk" and in the sloop "Merlin."

The second-class cruisers "Highflyer" (Belleville boilers) and "Minerva" (cylindrical boilers) carried out a series of comparative trials, the results of which were embodied in a Parliamentary Return.

The Boiler Committee appointed by Lord Goschen commenced their sittings in September last, but their experiments have not been concluded. The "Minerva" and the second-class cruiser "Hyacinth" (Belleville boilers) have been placed at the disposal of the Boiler Committee for comparative experiments. The "Minerva's" trials have commenced.

At the special request of the Board an *ad interim* report has just been presented by the Committee in reply to certain specific questions specially addressed to it. This report will be laid before Parliament, and all outstanding orders for boilers will be immediately reconsidered, and, if necessary, revised in the light of the information afforded by this report.

The torpedo-boat destroyers "Viper" and "Cobra," whose propelling machinery is of the turbine type, have completed their contract trials, obtaining high speeds. They will be further tested on service as soon as practicable. There are still many points connected with this system of propulsion which require experimental investigation.

Dockyards.

Satisfactory progress has, on the whole, been made during the current year on new construction in the dockyards. It is anticipated that, despite some delays which have occurred in deliveries of armour, and work on propelling machinery, and the large amount of repairing work performed on ships in reserve, the amounts voted for labour and issue of ordinary materials will in almost every respect be fully realised. Every endeavour is being made to attain this result.

The number of men employed in the dockyards has been gradually increased during the year to meet the additional work thrown on them by the growth of the Fleet.

The number of workmen borne in the home dockyards on April 1st, 1900, and on January 1st, 1901, are as follows:—

April, 1900 ...	...	...	28,833
January, 1901	...	...	30,330
Increase	...	...	1,497

This increased number includes about 690 dockyard and naval artificer apprentices who were entered in July, 1900.

Large Repairs during 1900-1901 at Home Dockyards.

The following ships have been or will be completed in the yards :—

Amphion	Grafton	Immortalité	Pegasus
Anson	Harrier	Impérieuse	Rattler
Beagle	Hawke	Iphigenia	Revenge
Blanche	Hazard	Lapwing	*Ruby
Camperdown	Hebe	Narcissus	Sparrow
Eclipse	Hood	Nymphe	Talbot
*Garnet	Hussar	Pallas	*Tourmaline

* Converting into coal hulks.

The following ships are now in hand, or their refit will be commenced during 1900-1901 :—

Barrosa	Fearless	Melpomene	Pearl
Blonde	Hecate	(if decided	Pheasant
Doris	Hermes	to proceed	Powerful
Europa	Leander	with refit)	Swallow
		Peacock	Venus

The details of the repairs and refits to be carried out in 1901-1902 appear in the appendix to the Navy Estimates. The principal items of work to be undertaken in this section are :—

*Audacious	Howe	Porpoise	Tartar
Barfleur	*Invincible	Spider	Undaunted
Centurion	Mohawk		

* Converting into bases for torpedo-boat destroyers.

NEW SHIPBUILDING PROGRAMME.

We propose to lay down in the coming financial year :—

3 battle-ships.
6 armoured cruisers.
2 third-class cruisers.
10 torpedo-boat destroyers.
5 torpedo-boats.
2 sloops.
5 submarine boats (ordered and work commenced in 1900).

Of these, 2 battle-ships, 1 armoured cruiser, and 2 sloops will be built in the Royal Dockyards. The rest will be built by contract.

The total Vote proposed for new construction is £9,003,256, of which £8,465,406 will be devoted to pushing forward the ships already in hand to the utmost of our power and to work on the submarine boats, and £537,856 to starting work on the additional ships to be commenced. The object aimed at in this distribution of the money is to advance the work on the many ships now under construction as far as possible towards completion, and to place the ships to be newly commenced into such a position that the utmost possible amount of work can be put into them in 1902-3.

The arrears in the delivery of hulls, armour-plates, guns, gun-mountings, and machinery have been a continual source of anxiety equally to the last and the present Board. The financial position of Messrs. Maudslay and of Messrs. Earle greatly contributed to the difficulties experienced in the deliveries of machinery. A committee has been appointed to thoroughly investigate the causes of the arrears in every case, and to advise how a recurrence of the evil can best be obviated. The committee consists of Mr. H. O. Arnold-Forster, M.P., Rear-Admiral A. K. Wilson, C.B., V.C., Sir Thomas Sutherland, G.C.M.G., and Sir Francis Evans, K.C.M.G.

NAVAL ORDNANCE.

The amount required under the Naval Ordnance Vote is larger than the original Vote for 1900-1901 by £915,000. An additional Estimate of £753,200 was, however, taken under this Vote during the year, so the net increase over 1900-1901 is £161,800.

A sum of £420,000 is included in the Estimate in practical completion of the policy of increasing the reserves of guns and ammunition.

Provision is also included for the continuation of the issue of armour-piercing shell to the Fleet.

Deliveries of the new design of the 12-inch B.L. wire gun have been made, and these guns are now mounted in the battle-ships of the "Formidable" class.

Some delay has occurred in the completion of the new 9·2-inch B.L. guns, as the trial of the first gun showed that a slight modification of design was necessary. Deliveries are, however, now being made, the first two guns having been mounted in the "Cressy," and it is hoped that the guns for succeeding ships will be ready by the time they are required.

A new gun of 7·5-inch calibre has been tried satisfactorily, and has been approved.

A 5-inch B.L. gun has been converted to take the Welin breech screw, and the design has been approved.

Progress is being made each year with the re-armament of the Fleet with ·303-inch Maxims in lieu of the older patterns of machine guns.

Telescopic sights have been adopted for Q.F. guns, and the supply is proceeding.

A new design of mounting for the 9·2-inch gun has been tried during the past year with very satisfactory results.

As the result of experience gained in South Africa and China some modifications and additions are being made to the seamen's equipment for service on shore.

Wireless telegraph apparatus has been obtained and supplied to a certain number of ships at home and abroad.

NEW WORKS.

WORKS PROVIDED IN ESTIMATES.

Chatham.—Good progress has been made with the new building slip, shops, &c. The new foundry will be completed early in next financial year.

Portsmouth.—Very satisfactory progress has been made with the new smithery connected with it, and it is expected the work will be completed during next financial year.

Devonport.—Good progress has been made with the new building slip; the shops will be commenced shortly.

Pembroke.—A contract has been made for the new smithery, and considerable progress has been made. It is expected that the work will be completed in 1901-1902.

Bermuda.—A contract has been made for the supply of the ironwork to be sent from England for the bridge between Somerset and Watford Islands. The excavation of a berth for the floating dock at Bermuda will probably not be completed till 1902.

Dredging.—The deepening of French Creek at Malta has been progressing, and a considerable amount of dredging has been done at Wei-hai-Wei.

Coaling Depôts.—A new sub-head has been introduced into Vote 10 in connection with coaling arrangements generally at home and abroad. Good progress is being made with the works already started at Chatham.

Hospitals.—Progress continues to be made with the work of providing additional and improved hospital accommodation at home and abroad.

Naval Armaments.—The torpedo range at Portland is expected to be practically finished by the end of next financial year; the contract for the pier is nearly completed, and one for the superstructure has recently been made.

Progress under Naval Works Loan Acts.

Chatham.—Dock.—A contract has been made, and the work is well in hand.

Colombo.—The new dock at this station is in hand, being built by the Colonial Government.

Malta.—Dockyard Extension.—A contract has been made for the new docks. Much subsidiary and preliminary work has also been carried out.

Bermuda.—Dockyard Extension.—Tenders for this contract are under consideration. Dredging on sites of wharf and breakwater preparatory to their construction has been in progress for some time.

Dartmouth.—Britannia Royal Naval College.—A contract for the main building and sick quarters has been made. Much work has been done in making roads, etc.

Magazines.—Work is progressing satisfactorily; that at Portsmouth in particular being in an advanced condition. The scheme at Chatham comprises an entirely new establishment.

Hospitals.—The Infectious Hospital at Haulbowline is completed, and Haslar Hospital will be completed in 1901-1902.

Enclosure and Defence of Harbours.

Gibraltar.—The Admiralty Mole extension was brought up to water-level throughout its whole length by 30th September, 1898. The quay wall on the harbour side of the Mole has been brought up to coping level for a distance of 2,358 feet. New coal sheds 750 feet in length have been completed on the Mole. The detached Mole has been completed except portions of the upper structure and the round heads at the north and south extremities. On the commercial Mole the reclamation and wharf wall are finished, and a portion of the new wharf has been opened for traffic. The northern arm is well advanced, and the viaduct and western arm are well in hand.

Portland.—The whole of the new breakwater was brought up to water-level on 17th April, 1899, and the work is being increased to the full section. The facing of a portion of the breakwater has been commenced.

Dover.—Admiralty Pier Extension.—The excavation for the foundation has been executed for about 450 feet, and block setting is in progress. The foundation course has been laid for a length of 440 feet, and the blockwork has been completed for a length of 260 feet at low-water level. The work at the junction with the existing pier head has been carried up to within two courses of low water.

East Reclamation.—The wall is now practically complete to cope level for a length of about 1,250 feet. Considerable progress has been made with the filling at the back of the wall, and the Eastern half of the blockyard is now being laid out.

East Arm and Root Wall.—Ten bays of the East Arm temporary staging have now been completed. Two goliaths, one 60 tons and one of 40 tons, are in use on this staging, and a second machine for 40-ton loads is in course of erection. About 400 feet of the foundations have been completed in the Root Wall, and about 100 feet of the East Arm above low-water level; a considerable quantity of concrete-in-mass has been deposited, and some of the Root Wall blocks have been set.

Adapting Naval Ports to Present Needs of Fleet.

Deepening Harbours and Approaches.—The dredging is finished at Chatham and Haulbowline. The dredging of Portsmouth Harbour is still in progress. The removal of the Vanguard, Rubble Bank, and Cremyll Shoals at Devonport is completed. The dredging above Saltash Bridge is in hand.

Keyham Dockyard Extension.—Graving Dock No. 4.—Side and end walls are complete. Excavation between the side walls is practically completed. Concreting under the floor is completed for a length of 375 feet.

Graving Dock No. 5.—Excavation of rock is nearly completed, and setting of granite floor stones has been commenced.

Graving Dock No. 6.—Good progress is being made in the excavation of the rock.

Entrance Lock.—The west wall is built to underside of coping for a length of 300 feet, and for the remaining length to level of 8 feet below coping. On site of floor and east wall the mud is being removed.

Closed Basin.—The north wall is nearly completed, east wall is completed. A length of 640 feet of west wall has been constructed up to levels varying from 38 feet

to 15 feet below coping. Excavation for Caisson Camber at entrance is in progress. Excavation of mud on site of basin has been continued.

Tidal Basin.—East and south walls, also south arm at entrances, are completed.

Outer Wall.—The wall is in progress and has been built to level of 3 feet below coping for a length of 160 feet at south end.

Gibraltar Dockyard Extension.—The Reclamation is in progress; pile foundations are being driven, and the superstructures of the Chief Constructor's and Chief Engineer's shops are in hand. The excavation of the New Mole Parade and the retaining walls have been completed. The excavation for No. 1 Dock is in progress. The dam for No. 3 Dock is finished; the enclosed area is pumped dry, and the excavation is in progress.

Hong-Kong.—The contractors have commenced the work of constructing the dock, reclaiming land, providing wharf walls and a basin, and erecting additional shops.

Simon's Bay Dockyard Extension.—A tender has been accepted for this work. The necessary land has been acquired, and the houses on the property are being converted into quarters.

Naval Barracks, etc.

Chatham Naval Barracks.—The west block of the seamen's quarters is nearly completed, and the two remaining blocks are well in hand. The officers' mess and the north and south blocks of officers' quarters are approaching completion.

Sheerness Naval Barracks.—The proposal to build new barracks for the Gunnery School at Sheerness has been abandoned, as the only available site was found on examination to be unsuitable on sanitary grounds. Negotiations for a site at Chatham are in progress.

Portsmouth Naval Barracks.—The War Office have transferred the Anglesea Barracks and have arranged for the transfer of further land required on the site of the Military Hospital. One block of Seamen's Quarters is up to roof level; the second block is up to second-floor level; and the third block has been commenced.

Keyham Naval Barracks.—The eastern block of Seamen's Quarters is practically finished; the western block is nearly finished. The Officers' Mess and Quarters are roofed in.

Chatham Naval Hospital.—The work is in hand, and some of the buildings are up to first-floor level.

A Naval Works Loan Bill to provide during the next two years for certain new works and for the expenditure on works already authorised will shortly be introduced.

1st March, 1901. SELBORNE.

The following is an abstract of the Navy Estimates for 1901-1902 and a comparison, showing increases and decreases, with the corresponding vote for last year :—

Votes.	——	Net Estimate.		Difference on Net Estimates.	
		1901-1902.	1900-1901.	Increase.	Decrease.
	I.—Numbers.	Total Numbers.	Total Numbers.	Numbers.	Numbers.
A	Total Number of Officers, Seamen, Boys, Coast Guard, and Royal Marines	118,625	114,880	3,745	—
	II.—Effective Services.	£	£	£	£
1	Wages, etc., of Officers, Seamen, and Boys, Coast Guard, and Royal Marines	5,760,000	5,527,000	233,000	—
2	Victualling and Clothing for the Navy	1,892,300	1,715,300	177,000	—
3	Medical Establishments and Services	219,000	208,800	10,200	—
4	Martial Law	16,200	13,300	2,900	—
5	Educational Services ..	100,600	92,300	8,300	—
6	Scientific Services	65,800	66,900	—	1,100
7	Royal Naval Reserves ...	292,100	271,100	21,000	—
8	Shipbuilding, Repairs, Maintenances, etc. :—				
	Section I.—*Personnel* ...	2,684,000	2,512,000 11,000	161,000	—
	Section II.—*Matériel* ...	5,306,500	4,084,000 55,100	1,167,400	—
	Section III. — Contract Work	6,685,500	6,329,000 410,000	—	53,500
9	Naval Armaments	3,919,700	3,004,700 753,200	161,800	—
10	Works, Buildings, and Repairs at Home and Abroad	1,023,100	845,800 40,000	137,000	—
11	Miscellaneous Effective Services	359,500	271,200	88,300	—
12	Admiralty Office	279,600	267,100	12,500	—
	Total Effective Services ...	28,603,900	25,208,500 1,269,300	2,180,700	54,600
	III.—Non-Effective Services				
13	Half Pay, Reserved, and Retired Pay	790,900	786,700	4,200	—
14	Naval and Marine Pensions, Gratuities, and Compassionate Allowances ...	1,140,100	1,123,600	16,500	—
15	Civil Pensions and Gratuities	340,600	343,500	—	2,900
	Total Non-Effective Services	2,271,600	2,253,800	20,700	2,900
	V.—Extra Estimate for Services in connection with the Colonies.				
16	Additional Naval Force for Service in Australasian Waters—Annuity payable under	—	60,300	—	60,300
	Grand Total ...	30,875,500	27,522,600	2,201,400	57,500
	Net Increase ...		1,269,300		

* Net increase £2,083,600

GENERAL.

The war-ships, exclusive of torpedo-boats, launched during the year 1900 for the various Navies, with their tonnage, I.H.P., and estimated speed, were as follows :—

Great Britain.—First-class battle-ships :—None. First-class armoured cruisers :—"Aboukir," "Hogue," of 12,000 tons, 21,000-I.H.P., and 21 knots speed. Third-class cruiser :—"Pandora," of 2,200 tons, 7,000-I.H.P., and 20 knots speed. Sloops :—"Rinaldo," "Mutine," "Shearwater," "Vestal," of 980 tons, 1,400-I.H.P., and 13 knots speed. Torpedo-boat destroyers :—"Cobra," of 350 tons, 11,000-I.H.P., and 35 knots speed ; "Tiger," "Falcon," "Lively," "Ostrich," "Peterel," "Sprightly," "Vixen," of 370 tons, 6,000-I.H.P., and 30 knots speed.

Austria-Hungary.—Second-class battle-ship :—"Habsburg," of 8,340 tons, 11,900-I.H.P., and 18 knots speed. Torpedo-cruiser :—"Szigetvar," of 2,400 tons, 7,000-I.H.P., and 20 knots speed.

France.—First-class armoured cruisers :—"Marseillaise," "Gloire," of 10,014 tons, 20,500-I.H.P., and 21 knots speed ; "Montcalm," of 9,517 tons, 19,600-I.H.P., and 21 knots speed ; "Dupleix," of 7,700 tons, 17,000-I.H.P., and 21 knots speed. Torpedo-boat destroyers :—"Épée," "Pique," "Yatagan," "Fauconneau," "Espingole," of 311 tons, 5,700-I.H.P., and 26 knots speed.

Germany.—First-class battle-ships :—"Wittelsbach," of 11,800 tons, 15,000-I.H.P., 19 knots speed ; "Kaiser Barbarossa," of 11,152 tons, 13,000-I.H.P., and 18 knots speed. First-class armoured cruiser :—"Prinz Heinrich," of 8,900 tons, 15,000-I.H.P., and 20 knots speed. Third-class cruisers :—"Thetis," "Ariadne," "Amazone," "Medusa," of 2,665 tons, 8,000-I.H.P., and 21 knots speed.

Italy.—Torpedo-boat destroyers :—"Strale," "Dardo," "Euro," of 320 tons, 6,000-I.H.P., and 30 knots speed.

Japan.—First-class battle-ship :—"Mikasa," of 15,150 tons, 15,000-I.H.P., and 18 knots speed. First-class armoured cruiser :—"Iwate," of 9,750 tons, 15,000-I.H.P., and 20 knots speed. Torpedo-boat destroyer :—"Umgumo," of 279 tons, 5,475-I.H.P., and 31 knots speed.

The Netherlands.—First-class gun-boat :—"Assaban," of 790 tons, 1,395-I.H.P., and 13 knots speed.

Norway.—Coast-defence battle-ships :—"Norge," "Eidsvold," of 3,800 tons, 4,500-I.H.P., and 17 knots speed.

Russia.—First-class battle-ships :—"Retvizan," of 12,700 tons, 17,000-I.H.P., and 18 knots speed ; "Pobieda," 12,670 tons, 14,500-I.H.P., and 18 knots speed ; "Kniaz Potemkin Tavricheski," of 12,580 tons, 10,600-I.H.P., and 16 knots speed. First-class cruiser "Aurora," of 6,630 tons, 11,610-I.H.P., and 20 knots speed. Third-class cruisers :—"Boyarin," "Novik," of 3,000 tons, 18,000-I.H.P., and 25 knots speed. Torpedo-boat destroyers :—"Kreut," "Korsun," "Filin," of 220 tons, 3,800-I.H.P., and 27 knots speed.

Sweden.—Coast-defence battle-ship :—"Dristigheten" of 3,500 tons, 5,500-I.H.P., and 17 knots speed. Torpedo-cruisers :—"Clas Uggla," "Psilander," of 800 tons, 4,500-I.H.P., and 20 knots speed.

Spain.—First-class armoured cruiser :—"Cataluna," of 7,000 tons, 15,000-I.H.P., and 20 knots speed.

United States.—Coast-defence monitors :—"Wyoming," "Arkansas," "Nevada," of 3,235 tons, 2,400-I.H.P., and 11 knots speed. Torpedo-boat destroyers :—"Dale," "Decatur," "Macdonough," of 420 tons, 8,000-I.H.P., and 28 knots speed.

FRANCE.—The following are the principal promotions and appointments which have been made:—Capitaines de Vaisseau—E. De Faubournet de Montferrand to "Isly" and command of Newfoundland and Iceland Division; E. F. F. Boisse to "Jeanne d'Arc." Capitaines de Frégate—F. O. Le Cannelier to "Rance"; M. E. De Kergrohen de Kermadio to "Manche"; R. O. D'Hespel to "Infernet"; B. M. De Saint Pern to "Surcouf": E. E. Farret and F. G. Schilling to Capitaine de Vaisseau.—*Journal Officiel de la République Française.*

It has been decided that in view of the delay in completing the refit of the first-class cruiser "Tage," which is to take the place of the "Cécille" as flag-ship of the Atlantic Division, Rear-Admiral Richard is to return to Toulon by the end of April instead of to Brest, in consequence of the immense amount of work now in hand at that dockyard, when he will haul his flag down, and the "Cécille" will be paid off into the Second Category of the Reserve for a thorough overhaul and repair. The new first-class cruiser "Chateaurenault" is having certain alterations effected in the arrangement of her cabins, etc., in view of fitting her to carry the flag of the Rear-Admiral commanding the Light Division of the Northern Squadron; she is very shortly to resume her trials, some modifications having been made in her machinery, and it is hoped that she will be ready to be commissioned in May. The third-class cruiser "Surcouf" is to take the place of the torpedo-cruiser "Fleurus," while the latter is under repair, her officers and men turning over to the "Surcouf." The second-class cruiser "Isly" is to be commissioned at the end of the month as Senior Officer's ship of the Newfoundland Fishery Protection Squadron; the transport-aviso "Manche" will commission at the same date also for service with the squadron. After having been over four years and a half under construction, the new first-class armoured cruiser "Jeanne d'Arc" is to be commissioned for her trials, which are being looked forward to with great interest, as she is intended to have a speed of 23 knots. Three hundred and sixty Reservists have been embarked on board different ships of the Mediterranean Squadron for 28 days' training.

Steam Trials.—The new first-class battle-ship "Iéna" has commenced her trials: with the engines developing 5,100-I.H.P., and making 90 revolutions, the mean speed attained was 14 knots: with the engines developing 15,000-I.H.P., and making 120 revolutions, a speed of a little over 17 knots was maintained: and it is hoped that, with the engines developing 15,500-I.H.P., and making 125 revolutions, the contract speed of 18 knots will be reached. In the meantime the machinery will have to undergo some modifications, as there was a tendency for the bearings to become over-heated, and the vibration of the ship during the trial was excessive.

The new torpedo-boat destroyer "Pique" has been continuing her trials. For five hours, with the engines making 268 revolutions, a speed of 22·2 knots was obtained; with 298 revolutions a speed of 25·5 knots was maintained for an hour, but the results are not considered altogether satisfactory. A sister vessel, the "Épée," has made another series of trials, five hours at 22 knots, six hours at 23 knots, and one hour at 25 knots: the trial is to be repeated. The torpedo-avisos "Lance" and "Salve" have made their trials off Cherbourg after refit, with nine-tenths of their H.P., the "Lance" with the engines developing 1,000-I.H.P., and making 275 revolutions, averaged 15 knots during the two hours' run: the "Salve," with the engines developing 950-I.H.P., and making 246 revolutions, averaged 14·5 during the same time. The torpilleur-de-haute-mer "Audacieux," during a two hours' full-speed trial, maintained a speed of 26·2 or 2 knots over the contract.

The Mediterranean Squadron.—Six torpedo-boats of the *Défense-Mobile* of Corsica, augmented by the destroyers "Levrier," "Espingole," and "Hallebarde," made an attack on the Mediterranean Fleet off Ajaccio on the night of 9th February. The fleet, composed of six battle-ships and three cruisers, was cruising with lights out, and the attack was arranged to take place between 3 and 5 a.m. The weather was bad, with a rough sea and storms of wind and rain, which made manœuvring difficult. The fleet was discovered at 4.45 a.m.: the attack was at once made, and four of the battle-ships

were torpedoed. Afterwards the fleet stood out to sea, and the "Cassard" was sent into Ajaccio to arrange about anchorage for the ships.

By a recent decree, Corsica has been made a *sous-arrondissement maritime*. The important works in progress at different points of the island, principally at Ajaccio, Bonifaccio, and Porto Vecchio, have made this necessary on account of the inconvenience found in being attached to the maritime prefecture of Toulon.

The Inscrits Maritimes.—The Minister of Marine has decided that the period of service of *Inscrits Maritimes* shall be raised from 54 to 56 months. At a time of the year like the present, when no new ships are being commissioned and when the Northern and Coast-Defence Squadrons are manned with reduced crews, this augmentation in the period of service is most unexpected, and can only mean that the numbers available are not sufficient for the wants of the fleet.

The *Inscription Maritime* has always been the boast of the French Navy, and this want of men causes some disquietude. During a period of thirty years the length of service has only thrice been raised above fifty months, and it has generally been much less than that figure.

This progressive lengthening of the period of service of the *Inscrit* is due in great measure to the augmentation of the fleet, its requirements having increased 20 per cent. in ten years, and the *Inscription Maritime* which seemed to be inexhaustible, appears no longer to suffice for the needs of the Navy. The mobilisation of the fleet at the present time requires 60,566 officers and men, and when the new programme of construction is completed, that is in 1907, 74,486 men will be required. Measures are under consideration for remedying this state of affairs, the consequences of which might be serious.—*Le Yacht* and *Le Temps*.

The Proposed Increase of the Fleet.—The following *précis* of the speech of M. de Lanessan, Minister of Marine, in the French Senate, during the discussion of the *projet de loi* for the augmentation of the French Fleet, may be of interest. The Minister began by stating that when the Government determined to lay before Parliament its proposals for the naval defence of the country and colonies, their action was not intended in any way as a hostile demonstration against any neighbouring State whatever, but was simply a measure necessary for ensuring that the country should remain mistress of its own destinies, and secure against any possible attack. "The Senate understands," he continued, "without my pressing the point, why I preface my remarks with this statement. I will now examine some of the criticisms which have been directed against the *projet de loi* during the debate, and I hope to convince the Senate that our proposals are not only such as the Navy itself wishes to see voted, but that they are best adapted to the interests of the Fleet. We have been told in the first place that "Your programme is insufficient. You are asking for six battle-ships, five armoured cruisers, a certain number of destroyers, torpedo-boats, submarines and submersibles. You ought to have asked Parliament for many more, in view of the inferiority of our Fleet as compared with those of other Powers." My reply is simple. We have to consider what new constructions can be taken in hand without exceeding the financial limit of the Budget, and without going beyond the producing powers of the dockyards and private building firms. Our Estimates have been calculated as precisely as possible, but the Chamber has gone beyond us; it has reduced from seven to six years the time we had allowed for the completion of certain work, and increased the total amount of the Estimates by fifty million francs. To-day we have really reached the limits of our financial capacity and of the producing powers of our arsenals and private yards. If it is desired that we shall undertake the construction of a large number of additional units, however much we may wish ourselves to increase the Fleet, we must refuse, because it would be impossible for us to realise the programme.

"We are next told that "Your programme has been much criticised; there are divergencies of opinion in the Navy as to such and such a type of ship; many seamen are in favour of having fewer battle-ships or even of doing away with them altogether;

some extol armoured cruisers, some protected; others are in favour of torpedo-boats and submarines." Now these differences of opinion exist more in the imagination of the Press than in the Navy itself. When I decided to submit to the Government the present programme, I did what every Minister of Marine ought to do, I placed myself in communication, not only with our most distinguished admirals, men whose opinions carry the greatest weight, but also with certain of the younger officers who consider that their seniors are not sufficiently advanced in their ideas. From all quarters I found that so far from there being this divergence of opinion, of which we hear so much in the Press, there was, on the contrary, a unanimous opinion in favour of all classes of ships. And it is only natural that there should be such unanimity. Our programme is not the result of the caprice of any one officer or officers, but has been drawn up from the actual experiences obtained at sea.

"There are but two important weapons in the Navy: the torpedo for short ranges, and the gun, whose power is increasing daily, for long. Two classes of ships are, therefore, essential: battle-ships and armoured cruisers in the first place; secondly, torpedo-vessels, including torpedo-boats, destroyers, submarine and submersible boats.

"In order that the action of the gun may be as effective as possible, it is necessary that the stability of the ship should ensure a steady platform, as far as may be, under all conditions of the sea, and this in its turn necessitates that the ship should be of a certain size, which means increased cost. With a large ship you can mount a numerous and powerful artillery, but the ship and her armament have in their turn to be protected by strong armour. This, however, in these days is not sufficient, a high rate of speed with a corresponding radius of action are also required, this last property being essential, if the ships are not to be continually returning to port to replenish their coal supplies. There is a limit, however, to the size of ships, as the depth of harbours and the accommodation of the dockyards have to be taken into consideration, and it would seem that the maximum convenient displacement for ships is about 15,000 tons. It is within the limits of this maximum that we have to move, when we wish to develop such and such special qualities in a ship. We have then to create two types, one the battle-ship, all-powerful for offence and defence, the other the cruiser, with the qualities of high speed and extended radius of action. The armament of battle-ships to-day consists in the main of four 30-centimetre (12-inch) heavy guns and from fifteen to eighteen 15·2-centimetre (6-inch) Q.F. guns; the armour protection of the belt is now about the same thickness as the calibre of the heavy guns carried, and the thickness of the armour for the casemates of the secondary armament is calculated in the same way. It is to meet these conditions that we, on behalf of the Navy, are now seeking authorisation for the battle-ships of 14,800 tons which appear on the Estimates, and which in offensive and defensive powers speed and radius of action, will be equal to the ships of other nations. The ironclad will, therefore, be the most powerful instrument of both offensive and defensive warfare. How will it accomplish its task? In the first place, by engaging battle with the enemy's ironclads in the open sea, keeping them at a distance from the coast. But it is not only in fighting great naval battles that ironclads are useful. If it should be desirable to carry war into the enemy's territory, blockade its arsenals, bombard its forts, and land troops, ironclads are necessary, as they alone are capable of attacking fortifications and of protecting troops while landing or re-embarking. That is not all. If, in the case of war, communications are to be kept between France and Algeria, and Tunis, the sea route must be guarded, or the transports escorted. The squadrons employed in such a service must be composed of ironclads, as the troops must not be exposed to annihilation by a squadron of the enemy.

"In the opinion of some people it would be wiser to substitute a war against commerce for a war of fleets; but a war against commerce could not be carried on with any chance of success without squadrons of battle-ships. The question had been carefully considered by the Superior Council of the Navy and by other eminent authorities, and they had all arrived at the same conclusion. Allowing that they had in their

harbours a large number of cruisers ready to launch against the enemy's commerce, if the harbour was blockaded by a strong force of the enemy's battle-ships, how would they get out? But supposing that they got safely to sea and captured many prizes, what then? Were they to destroy all their prizes? That would quickly entail terrible reprisals; and if not, how were they to get them safely into harbour, or even to get back into harbour themselves, when they want to replenish stores, refill with coal, etc.? It is quite possible that fast cruisers may break the blockade and escape, but they will find it much more difficult to return. If our cruisers are to be able to leave and return safely to our harbours, they can only do so under the protection of our battle-ships. This is not the view only of old officers, but of our most capable admirals and captains, and that is why we are asking for the new large battle-ships, which appear in our programme.

"Certain members consider that we are building too many battle-ships and not enough cruisers. But is that the case? We require four squadrons of six battle-ships each, with four more for a reserve, making a total of twenty-eight. At the present time we have twenty-two, which are effective, and we are asking for the six additional ones to make up the twenty-eight. Later on we shall have to replace in turn the older ships; but accepting fully the responsibility for my statement, I maintain that it will not be necessary for us to exceed the number of squadrons or battle-ships I have mentioned."

The Minister then drew attention to the difficulty experienced in getting a sufficient number of skilled mechanics, especially for the engine-room department, and also pointed out that difficulty was experienced in getting stoker recruits, a difficulty, he said, which other Navies were also finding. Particularly was this the case with England, and it was certain that before long she would not be able to man all the new ships she was building. It was better, therefore, to limit the number of units, while devoting all possible attention to making them perfect engines of war, and to the high technical training of their crews.

Passing on, then, to the question of the respective values of French and foreign battle-ships and cruisers, M. de Lanessan drew favourable comparisons between the designs of the new French ships and the new English and German battle-ships and armoured cruisers, maintaining that the French ships were better protected and carried a more numerous and more powerful artillery, and will be of a more formidable type than any ships now building for any foreign Powers. Both England and Germany had sacrificed thickness of armour in the hope of attaining higher speed. Dealing with the transformation which had taken place in the building of cruisers, he pointed out that France was the first naval Power to construct armoured cruisers, and she had maintained a considerable advance over other Powers in building that type. The Minister of Marine then proceeded to defend the construction of more torpedo-boats, and also of submarine and submersible boats, and in conclusion he declared that by the end of 1906 their Fleet would be sufficiently strong to prevent any hostile designs against their coast, and also enable them to maintain their interests abroad, which were often threatened. They would thus realise the idea of all democracies, to live at peace with their neighbours, but to do this, he repeated, they must be strong.

M. Lockroy, the predecessor of M. de Lanessan at the Ministry of Marine, and who has long established a reputation as a careful student of naval matters, in an eloquent speech regretted that France was the country at present where naval questions attracted no interest among the general public. He considered that the transfer of the marine troops to the Ministry of War was a blunder, and drew attention to the extraordinary delay in the completion of the "Henri IV." and "Jeanne d'Arc," as well as of the torpedo-boats building in the Government yards. On the subject of the new building programme, M. Lockroy, in view of past delays, expressed grave doubts whether the new ships would be finished by 1906; he was afraid that, unless radical steps were taken to improve the system of shipbuilding, 1909 or even 1910 was more likely to be the date. He called attention to the fact that Germany was spending considerably more on her Navy than France was, and was making great efforts to take rank as the second naval Power in Europe. With regard to the naval schools, he would

like to see a return to the system which he had himself inaugurated, by which they were partially installed on sea-going battle-ships and cruisers. He strongly advocated the concentration of the battle-ships at Toulon and Bizerta, and of the cruisers at Brest; and he deprecated any diminution of the powers of the maritime prefects, which, in his opinion, would be a misfortune for the country; and he concluded with a moving peroration pointing out the high *rôle* in the destinies of the country which the Navy was called on to play.

Vice-Admiral Rieunier, also an ex-Minister of Marine, who followed M. Lockroy, associated himself with much that that critic had said, and he further drew attention to the great increase in red tape and paper work which caused great delay in carrying out necessary work: he advocated an increase of one-fifth in the *personnel* of the fleet, which was at present insufficient for the needs of the Navy even in a time of peace: and he further thought a considerable increase in the reserves of coal absolutely indispensable.

The text of the most important articles of the *projet de loi* relative to the augmentation of the fleet is as follows:—

Article 1.—The Minister of Marine is authorised to construct in the dockyards and by private contract new vessels to the amount of 526,836,000 francs (£21,073,440), viz., 6 first-class battle-ships of 14,865 tons; 5 armoured cruisers of 12,600 tons; 28 destroyers of 250 tons (about). Torpedo-boats, submarine and submergible boats, the number of which is not yet fixed, at a total cost of 118,300,000 francs (£4,732,000).

Article 2.—The credits for new constructions authorised by the Budget of 1900 and by the present law amounting to 762,212,000 francs (£30,488,480) are to be expended before 1st January, 1907.

M. Fleury-Ravarin, the reporter of the Estimates to the Chamber, lays stress on the fact that henceforth the torpedo-boats of the mobile defence would be able to defend on four classes of stations:—1. The administrative and strategic centres of mobile defence, where the boats will find under all circumstances a sure refuge with all the means required for repairs and reprovisioning, and with accommodation for the *personnel*. 2. Stations which will have permanently neither torpedo-boats nor *personnel*, but which will have resources similar to those of No. 1, though on a smaller scale. 3. Stations of refuge with means to recharge the torpedoes, to effect quickly small repairs, and to furnish fresh supplies of water, coal, and provisions. 4. Stations to be used as a temporary refuge only, and having some supplies of water, coal, and provisions. The full programme of mobile defence allows for the utilisation of 238 torpedo-boats, which include those already either built or building, and of 29 destroyers, each of which serves as the leading boat of a flotilla.—*Journal Officiel de la République Française* and *Rapport fait par M. Fleury-Ravarin du Projet de Loi portant fixation du Budget Général de l'Exercice 1901 (Ministère de la Marine)*.

ITALY.—The following appointments have been lately made:—Vice-Admirals—G. B. Magnaghi to command of First Maritime Department (Spezia); F. N. Canevaro to command of Third Maritime Department (Venice); G. Palumbo to command of Second Maritime Department (Naples); L. Serra to command at Maddalena; G. Gonzalez del Castiglio to be Vice-President of the Superior Council of the Navy. Rear-Admiral—C. Candiani to command of Cruising Division.

The home fleet, which formerly constituted two squadrons, the Active and Reserve, and has for the last two years been organised as one and styled the Mediterranean Fleet, under the supreme command of Admiral H.R.H. the Duke of Genoa, is at present composed as follows:—

First-class-battle-ships—"Lepanto" (flag-ship of commander-in-chief), "Sardegna" (flag-ship of Rear-Admiral Coltelletti), "Sicilia," "Dandolo," "Morosini."

Second-class torpedo-cruisers—"Urania," "Partenope."

Torpedo-boat destroyers—"Lampo," "Rapido."

The torpedo-flotilla, under the command of Rear-Admiral Reynaudi, is at the disposal of the commander-in-chief of the Mediterranean Fleet, but the divisions are distributed as follows :—

Genoa.—Nos. 100, 101, 102, 103, 104, 105.
Spezia.—Nos. 106, 107, 108, 109, 110, 111.
Gaëta —Nos. 118, 119, 120, 121, 122, 123.
Taranto.—Nos. 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153.
Civita-Vecchia. — "Aquila," "Falco," "Nibbio," "Sparviero," "Avvoltoio," "Condore," "Pellicano," Nos. 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 88, 89, 90, 92, 93, 94, 95, 96, 97, 98, 99.
Venice.—Nos. 76, 77, 78, 79.

Cruising Squadron.

First-class armoured cruiser. – "Vettor Pisani" (flag-ship of Rear-Admiral Candiani).
Second-class torpedo-cruisers—"Fieramosca." "Stromboli." "Vesuvio," "Dogali." "Elba." "Calabria."
This squadron is at present in China.

In the Red Sea.

Corvette-cruiser—"Cristoforo-Colombo."
First-class gun-boats—"Volturno," "Provana."
Training-corvette—"Volta."

In the Levant.

First-class despatch-vessel—"Archimede."—*Gazzetta Ufficiale.*

It is, however, now stated that during the coming summer the old organisation of an Active and Reserve Squadron will be reverted to, and that the fleet will be re-organised. It has been decided to send an Italian squadron to Nice in April, on the occasion of the visit of the French President to the town, as the visit made by the French squadron to Cagliari last year to salute the Italian Sovereign has not yet been returned.

New Ships.—For the last two years the building of new battle-ships has practically been at a standstill, due to grave differences of opinion, which existed at the Ministry of Marine itself as to the best type of ship to lay down, and also to the difficulties experienced in getting the necessary funds from Parliament. These difficulties are believed now to have been surmounted. Last June it was practically decided to lay down four ships of a medium type between battle-ships and armoured cruisers; these new vessels were to be 442 feet long, with a beam of 62 feet 8 inches, and a displacement of 8,500 tons, while the engines were to give a speed of 20 knots; protection being afforded by a 6-inch water-line belt and a 2-inch armoured deck: the armament consisting of twelve 8-inch and eight 3-inch Q.F. guns. These ships were to have been named the "Genova," "Pisa," "Venezia," and "Amalfi"; none of these, however, had been commenced.

The ships in question are, however, now not to be built; the Minister of Marine, acting under the advice of the Superior Council of the Navy (Consiglio superiore di Marina) has decided that the design of the ships is faulty, as it is impossible on so small a displacement to give a vessel the necessary offensive or defensive powers. It has, therefore, now been decided, subject to the approval of the King, that three new first-class battle-ships, to be called the "Vittorio Emanuele," "Regina Elena," and "Roma," are to be laid down at Spezia, Castellamare, and Venice respectively. Their principal dimensions are to be as follows:—Length, 433 feet; beam, 72 feet; draught of water, 28 feet, with a displacement of 12,600 tons. The engines are to develop 20,000-I.H.P., giving a speed of from 21 to 22 knots; the coal stowage capacity is to be 2,000 tons, which will give a radius of action of 10,000 miles at a speed of 10 knots. Protection will be afforded by a water-line belt of 10-inch steel; the redoubt and bulkheads will be of 8-inch steel; the turrets for the heavy guns of 8-inch, and the turrets for the secondary armament of 6-inch; the conning-tower of 10-inch, and

the armoured deck of two layers of 2-inch steel ; all the armour will be hard-faced by the Krupp process. The armament will consist of two 12-inch guns, one in a turret forward and one aft ; twelve 7·9-inch Q.F. guns in turrets on the broadsides, six each side ; twelve 3-inch and twelve 6-pounder Q.F. guns, with four broadside torpedo-discharges, two above and two below the water-line.

It is hoped that the new first-class battle-ship "Benedetto Brin" will be ready for launching from the yard at Castellamare during the coming summer ; her dimensions are as follows :—Length, 426 feet 6 inches ; beam, 78 feet 2 inches ; draught of water, 27 feet 4 inches, with a displacement of 13,427 tons. Her engines are to develop 19,000-I.H.P., giving a speed of 20 knots, while her normal coal supply will be 1,000 tons. Protection will be afforded by a water-line belt of 6-inch steel, with 8-inch on the turret, for the 12-inch and 7·9-inch guns, and 6-inch on the casemates for the secondary armament, with a 3-inch armoured deck. The armament will consist of four 12-inch guns, four 7·9-inch Q.F. guns, twelve 6-inch Q.F. guns, sixteen 3-inch Q.F. guns, and twelve boat and machine guns, with four submerged torpedo-tubes. It is hoped that her sister ship the "Regina Margherita," building at Spezia, will be launched during the spring.

A fast steam collier of 6,000 tons displacement is also to be laid down, but at which yard has not yet been decided.

A sum of 24,000,000 lire (£960,000) will be asked for in the Estimates for 1901-02 towards the completion of the "Benedetto Brin," the "Regina Margherita," the first-class armoured cruiser "Francesco Ferruccio," some torpedo-boat destroyers, and the proposed collier.

Admiral Morin, the Minister of Marine, is fully alive to the necessity of taking steps to bring the fleet up to a proper strength, and the Government share his views, but the difficulty is not to exceed the Budgetary limits ; however, it has been decided to ask the Chamber to vote a Supplementary Credit of 32,000,000 lire (£1,280,000). In the Chamber there seems to be a practically unanimous opinion as to the necessity of maintaining the equilibrium of the Budget ; although there is a group of members who, considering that the sum demanded is not sufficient to meet the naval needs of the country, are of opinion that a new loan of from 200,000,000 to 300,000,000 lire (£8,000,000 to £12,000,000) should be raised.

During the discussion on the Budget in the Chamber, Admiral Accini made a bitter attack on the Minister of Marine, pointing out that, from having held the third rank among European Navies a few years ago, Italy had now fallen to the sixth or seventh rank as a naval Power. The country, he maintained, was running great risks of having their fleet destroyed by surprise ; it was a mistake to suppose that every country had an interest in living at peace with Italy, and on counting too much on alliances. Five-sixths of her coasts were vulnerable to an attack from an enemy, to which Italy could only oppose a fleet much reduced in numbers and in an inefficient condition.

The Minister of Marine has also brought forward a scheme for spending 389,000,000 lire (£15,560,000) on the Navy, this amount to be spread over twelve years in three periods :—From 1901 to 1904 inclusive, 203,000,000 lire (£8,120,000) to complete work now in hand, to construct five battle-ships at a cost of 24,000,000 lire (£960,000) each ; sixteen destroyers at a cost of 1,200,000 lire (£48,000) each ; two auxiliary ships, and the reconstruction of the battle-ships "Italia" and "Lepanto."

From 1905 to 1909, a sum of 139,000,000 lire (£5,560,000) will be expended on five more battle-ships ; two auxiliary ships ; the commencement of a sixth battle-ship and eleven torpedo-boats to replace others worn out.

Lastly, from 1910 to 1912 a sum of 77,000,000 lire (£3,080,000) will be expended in replacing obsolete ships, two of which will be battle-ships.

Steam Trials.—The second-class battle-ship "Ammiraglio di St. Bon," built at the Royal Dockyard, Venice, and engined by the firm of Ansaldo & Co., of Leghorn, has commenced her steam trials off Spezia. At a recent trial, with the engines developing 9,919-I.H.P., out of a possible 13,000-I.H.P., making 93·5 revolutions, a mean speed of something over 17 knots was maintained ; the pressure on the boilers was 134 lbs. ; the

vacuum in the condenser 27 inches. She is a ship of 9,800 tons, and her maximum speed is to be 18 knots. The result of the trial was considered very satisfactory, and it is considered that she will easily attain the full speed demanded from the contractors. Her sister ship the "Emanuele Filiberto" has not been so fortunate, as at her full-speed trial a mean of 17 knots only was obtained. This is in a measure due to the fact that both ships have now been some seven years under construction, and considerable alterations have been made since they were designed, with the result that they now draw more water than was originally intended.

The new first-class armoured cruiser "Varese," built and engined by the firm of Orlando at Leghorn, has successfully completed her trials and been taken over from the contractors. At her 6-hours' trial under natural draught off Spezia the following results were obtained:—Mean revolutions of main engines, 95·71; mean I.H.P. developed, 9,479; mean speed, 18·3; coal expenditure per I.H.P. per hour, ·0886 kilogramme. At the 3-hours' trial under forced draught the following results were obtained:—Mean revolutions of main engines, 105·58; mean I.H.P., 13·885; mean pressure on boilers, 201 lbs.; mean speed, 20·02; expenditure of coal per I.H.P. per hour, 1·858 kilogrammes. Her boilers are of the Belleville type, and the machinery worked well; her gun trials are to be carried out next month, and if all goes well the ship will be commissioned to join the Active Squadron of the Mediterranean Fleet in the early summer.

The "Varese" was laid down in September, 1898, and launched on the 6th August, 1899, so she has been completed in a creditably short time. She is a vessel of 7,400 tons displacement, with a mean draught of 23 feet 9 inches; 325 feet long with a beam of 59 feet. Her engines are intended to develop 13,500-I.H.P., under forced draught, giving a speed of 20 knots. Protection is afforded by a water-line belt of 6-inch hard steel, with an upper streak carried up to the level of the main deck from the stern to within 100 feet of the bow, and above this again it rises to level of the upper deck in the form of a casemate amidships for the secondary battery. The armament consists of one 10-inch gun in a turret forward, two 8-inch Q.F. guns in a turret aft, both turrets protected by 6-inch hard steel; fourteen 6-inch Q.F. guns; ten 3-inch Q.F. guns, and six machine guns, with four torpedo-tubes. The heavy turret guns have an arc of training of 270°; of the 6-inch guns, ten are in the central battery, and the other four on the superstructure at the four angles of the casemate below. Her bunkers will hold 1,400 tons of coal, giving her a radius of action at 10 knots of 9,300 miles.

The new torpedo-boat destroyers "Lampo" and "Freccia," built at Elbing by the Schichau firm, have completed their trials satisfactorily. They are the first of a group of six similiar vessels to be completed, the other four being the "Dardo," "Strale," "Ostro," and "Euro." They are vessels of 320 tons, 6,000-I.H.P., and 30 knots speed. The trials of both vessels have been satisfactory, as at their 2-hours' full-speed run, with the engines making 350 revolutions, they made a mean of 31·17 knots; at a 6-hours' run at 25 knots, the coal consumption was 820 grammes per I.H.P. per hour. —*Rivista Nautica* and *Mittheilungen aus dem Gebiete des Seewesens.*

UNITED STATES.—***The New 12-inch Naval Gun.***—**The new 40-calibre 12-inch gun, the first lot of which will be mounted on the new monitors and on the "Maine" class of battle-ships, and which will henceforth be the standard weapon of this calibre for our Navy, has been completed and tested at the Naval Proving Grounds, Indian Head; about twenty rounds having thus far been fired.**

With a charge of 360 lbs. of smokeless powder, and a projectile weighing 850 lbs., a muzzle velocity of 2,854 foot-seconds was obtained with a corresponding muzzle energy of 47,994 foot-tons, the chamber pressure being 16½ tons per square inch, or a half ton less than the designed working pressure of 17 tons. We are informed that the gun, its mechanism, and mount, functioned admirably in every respect. The Bureau of Ordnance is to be congratulated in having achieved such admirable results.

The fact that this gun shows 54 foot-seconds greater velocity than it was designed for, with half a ton to the square inch less pressure in the powder chamber, speaks volumes for the excellence of the multi-perforated, all guncotton smokeless powder which has been adopted by the Navy; for unlike the high nitro-glycerine powders, such as cordite, which are used by some other nations, our new Navy powder achieves these splendid results without any perceptible deterioration of the inner surface of the gun.

It is interesting to compare the new weapon with the 35-calibre 12-inch guns now in service. The new gun weighs 53·7 tons and has a muzzle energy of 893 foot-tons per ton of gun. The present 12-inch gun, which weighs 45·2 tons, has a muzzle velocity with smokeless powder of 2,300 foot-seconds, and the corresponding muzzle energy of 31,170 foot-tons amounts to only 689 foot-tons per ton weight of the gun. From the above comparison it will be seen that the muzzle energy of the new 12-inch gun exceeds that of the old by 53 per cent.

If the energy developed by one round of the new gun could be applied as a constant upward thrust beneath a 12,000-ton battle-ship, it would be sufficient to raise it 4 feet from the ground.

The excellence of this weapon is shown by a comparison with other 40-calibre 12-inch guns, which are being constructed by the leading gun-makers of the world. At the bottom of the list is the French gun, which in spite of its high velocity shows a muzzle energy of only 30,750 foot-tons, the relatively small energy being due to the very light shell, which weighs only 644 lbs. The inferiority of this gun is greater than appears on the surface figures; for the lightness of the shell will cause the velocity of the projectile to fall away far more rapidly than that of the heavier projectiles. We should note in this connection that although the muzzle velocity of the Krupp 40-calibre gun is lower than that of the new United States gun, because of the greater weight of its shell, it will approach it in respect of its remaining energies at the longer ranges. Judged by the muzzle velocity and muzzle energy, the new United States weapon stands easily first; but judged by the standard of energy per ton weight of the gun, it will be seen that the Krupp weapon has a considerable lead. It would be interesting, in this connection, to note how Krupp obtains these results with a gun so comparatively light in weight. It is possible that this gun is constructed of nickel-steel, and that an abnormally high chamber pressure is allowed.

Comparison of 40-calibre 12-inch Naval Guns.

—	Weight in tons of gun.	Weight in lbs. of projectile.	Muzzle velocity feet per second.	Muzzle energy in foot-tons.	Foot-tons energy per ton of gun.
United States, Naval	53·7	850	2,854	47,994	893
German, Krupp	48·9	981	2,592	45,662	934
British, Vickers	50·3	850	2,600	39,843	792
British, Armstrong	50·8	850	2,580	39,233	772
British, Naval	50·0	850	2,481	36,290	726
French, Naval	45·9	644	2,625	30,750	670
12-inch Guns of 35 and 50 calibres.					
United States Naval, 35-calibre[1] ...	45·2	850	2,300	31,170	689
Krupp, 50-calibre	62·4	981	2,953	58,205	934
Krupp, 50-calibre	62·4	771	3,330	58,205	934

[1] Old pattern as used on "Iowa."

Following the table of the 40-calibre guns are placed three guns of 35 and 50 calibres, the first being the type of 12-inch gun at present in use in our Navy, and the 50-calibre guns being two of the 1899 Krupp models, which the company state have actually been manufactured and tested with the results herewith shown. The enormous energy of 58,205 foot-tons is obtained in the first of these two weapons

with a 981-lb. projectile having a muzzle velocity of 2,953 foot-seconds, and in the second by a 771-lb. projectile driven at 3,330 foot-seconds velocity, the energy of 934 foot-tons per ton weight of gun being, as far as we know, the greatest efficiency yet obtained with any gun, experimental or otherwise. As this gun is over 50 feet long, however, it is altogether too unwieldy for service on ship-board, at least according to the present accepted ideas on the subject.—*Scientific American.*

Graphical Comparison of the Efficiency of Naval Guns.—The efficiency of modern ordnance is known to the expert from numeric tables giving velocities, energies, power of perforation of the projectiles, etc., at different ranges. Collections of numeric *data*, however, are not to everybody's taste. A clear understanding is obtained much easier, and in a more direct way, by the graphical method, which is nowadays used to show the movements or changes in all important relations of life and labour. The annexed diagrams have been designed to convey to the reader at a glance a correct opinion of the comparative value of certain naval guns. They show the energies of the projectile when leaving the muzzle of the gun, and at various fighting distances. As to our knowledge, the well-known German author, Captain Castner, has been the first to apply the graphical method to show the ballistic properties of guns, we have thought it of special interest to our readers to reprint the very instructive article from the German paper *Prometheus.*

It is not always possible in constructing a gun, says Captain Castner, to reach the greatest energy of the projectile obtainable within the limits of its calibre. The purpose of the gun, the special use for which it is designed, may necessitate a compromise, sometimes with a considerable reduction of its energy. High-angle and verticle fire, as from howitzers and mortars, for instance, cannot be combined with maximum energies. Rapid-fire field guns, although their trajectory is flattened, are less efficient, and convey a much smaller energy to their projectiles than rapid-fire naval guns of equal calibre, as a field gun has to be light to be moved from place to place, while a naval gun remains stationary. The English naval 7·6-centimetre (3-inch) gun L/40, for example, which in the South African War was taken ashore, put on Captain Scott's improvised wheeled gun-carriage and used before Ladysmith and at other places, throws a shell weighing 5·7 kilogrammes with a muzzle velocity of 670 metres and an energy of 131 metre-tons; while English field guns, model of 1894-95, of 7·6-centimetre (3-inch) calibre, which also were in use against the Boers, convey to their 6·3-kilogramme shell only 471 metres initial velocity, or 71·8 metre-tons initial energy.

As will be seen from the above, with naval guns the leading idea is to reach the maximum of hitting energy which their calibre will allow within a reasonable limit of the gun's length, for having to attack ship's armour, they require great perforating power.

The annexed diagrams illustrate what has been accomplished in this regard, and will help the reader to form a definite opinion about the naval guns of different systems.

On Plates I. and II. the upper dotted lines refer to the velocities of projectiles. Issuing from those points of the ordinate of velocity A B (see Plate I.) which answer to the muzzle velocities given in the headings,[1] these curves, as they

[1] For the non-expert reader we add a few explanations. Initial or muzzle velocity is expressed by so many metre-seconds, or foot-seconds, meaning that the projectile after leaving the bore would travel so many metres or feet during the first second. This velocity is given in the headings of the plates, and according to international usage is called Vo; V means velocity, L means energy of projectile, P means weight of projectile, L/40 means 40 calibres length, C/97 means construction (or model) of 1897, R.F.G. means rapid-fire gun.

descend from left to right, demonstrate the gradual loss in velocity up to a range of 5,000 metres.

The better the projectile maintains its velocity, the less the curve deviates from the horizontal.

With guns of equal calibre, then, one might be led to think that a projectile leaving the muzzle at a higher velocity would lose less of it during its flight than one of smaller muzzle velocity. This, however, is not always so, as shown for instance on Plate I. Here the dotted curve of the velocities of a projectile leaving the muzzle with 729 metres deviates much less from the horizontal than the dotted curve of a projectile of 762 metres muzzle velocity. At the range of 5,000 metres the former still retains 491 metres, the latter only 448 metres. And why? Because there is a difference in weight of the two projectiles, that of the first dotted curve being 55·3 kilogrammes heavier than the other. The heavier projectile is less influenced by the resistance of air, and therefore keeps its velocity better than the lighter one.

The lower, full-drawn curves mark the energies of projectiles. They issue from a point of the first ordinate corresponding to the energy with which the projectile leaves the muzzle.

Energy is a function of both the velocity of the projectile and its weight. The amount of energy is the essential proof of the efficiency of a gun. *Data* of high velocities, unaccompanied by *data* of weights of projectiles or energies of projectiles, are insufficient to form a judgment of the gun, and apt to mislead and bluff the reader, the more so as they have the appearance of being scientific. The curves on Plate I. demonstrate this by a very good example: The initial velocity of Armstrong's 24-centimetre gun L/40 is by 33 metres greater than that of Krupp's gun of the same calibre and length (762 against 729 metres), but its muzzle energy is 1,098 metre-tons smaller (4,726 against 5,824 metre-tons), and at a range of 5,000 metres is still 1,012 metre-tons smaller. In other words, Krupp's gun conveys to its projectile an average of 1,000 metre-tons more energy; its efficiency is from 20 to 25 per cent. higher.

A similar comparison with the Schneider-Canet gun would show that though it has a greater velocity than the Krupp gun, its fighting power, however, is far less.

It has been said before that the leading idea in constructing a naval gun ought to be to give it the greatest possible power of perforation. But that does not imply that the weight of the gun is of no consequence. Everything else being equal, the gun of smaller weight is always preferable, because it is more easily handled, and it uses up less of the carrying capacity of the ship, which is always to be treated with the utmost economy. A light gun of the same efficiency as a heavier one speaks well for its quality, both as to material and to construction.

This quality of the gun is usually expressed by stating the amount of energy of the projectile for every kilogramme (or pound) of the weight of the gun. On Plates I. and II. these *data* are added to those of the total energies at the ranges of 0 and 5,000 metres. It is remarkable how much the German gun's construction is superior in this respect to the English one, the more so as the English guns are wire guns, the wire construction being adopted with the pronounced purpose of obtaining a better relation between energy of projectile and weight of gun than had been possible with the English hooped guns made of Martin-Siemens steel.

The efficiency of guns is generally expressed in metre-tons or foot-tons. Familiar as it is to experts, to others this way of measuring appears rather academical. To them it seems simpler, and of a more direct practical interest, to learn how thick an armour plate may be which the projectile will be just able to perforate, striking it normally, at certain ranges. Comparing the power of perforation of guns furnishes direct practical knowledge. For this reason two

more plates, IA. and IIA., have been added to those showing the velocities and energies. They repeat the energy curves the same as on I. and II., but the numbers which give the energies in metre-tons are supplemented by other bracketed numbers, expressing in centimetres what thicknesses of Harveyized armour can be perforated when hit normally with these energies. Such thicknesses of armour have been calculated only for the principal fighting ranges, viz., for 1,000 to 5,000 metres. The plates also contain graphical information, showing up to what range the perforating power of the guns in comparison is sufficient against armour of two different thicknesses. On Plate IA., for example, it is shown that Krupp's 24-centimetre (9½-inch) rapid-fire gun perforates Harveyized armour 30 centimetres thick up to 3,100 metres range, while Armstrong's gun of the same calibre, in spite of its greater muzzle velocity, can do this only up to 1,250 metres. Harvevized armour 25 centimetres thick is perforated by Armstrong's gun up to 2,400 metres, by Schneider-Canet's 24-centimetre L/40 gun not even beyond 2,000 metres range (see Plate IIA.), while the energy of the Krupp gun does it up to 4,500 metres. The superior power of the German construction is also clearly demonstrated in Plate IIA. And still Krupp's guns C/99 have even higher power of perforation than those of C/97, to which the graphic plates refer, and whose superiority over English and French guns is even greater.

It is evident of what importance this superiority and perforating power must be in the first stages of a naval engagement, when fire is opened at the longer ranges.[1]

Captain Castner closes his article with the following words, which seen in the light of political events seem of particular interest :—"Considering the pending increase of the German Navy, these considerations are of the greatest interest. Germany's development is a strong motive to raise her sea power as much as she can possibly afford. One of the most important factors, the construction and manufacture of ordnance, is undoubtedly progressing in the right direction."

P.S.—It will be noticed that the diagrams refer to Krupp's guns of C/97 only, and not to his more recent designs, which are called C/99. Since the original of this article appeared in the German review *Prometheus*, new *data* of some foreign guns, especially of Schneider-Canet's, have been published in the English "Brassey's Annual" for 1900. If these quite new designs are put into account, it is just to compare them with Krupp's C/99, the *data* of which also appeared in "Brassey's Annual." It will be found, then, that the relative value of the two systems has practically remained the same as demonstrated in the above article.—*Scientific American.*

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[1] Armour of all kinds and different grades of resistance is met with on the different older iron and steel-clad ships of all fleets. In order to enable the reader to obtain the necessary *data* for other than Harveyized armour, the following comparative resistances are stated here: The relation between the resistance of equal thicknesses of wrought iron, compound, Harveyized, and Krupp armour, in round numbers, is as 1 to 1·2 to 2 to 3, meaning that Krupp's armour furnishes three times as much resistance as wrought iron.

PLATE I.

Velocities and Energies of Projectiles
up to 5000m from the muzzle.

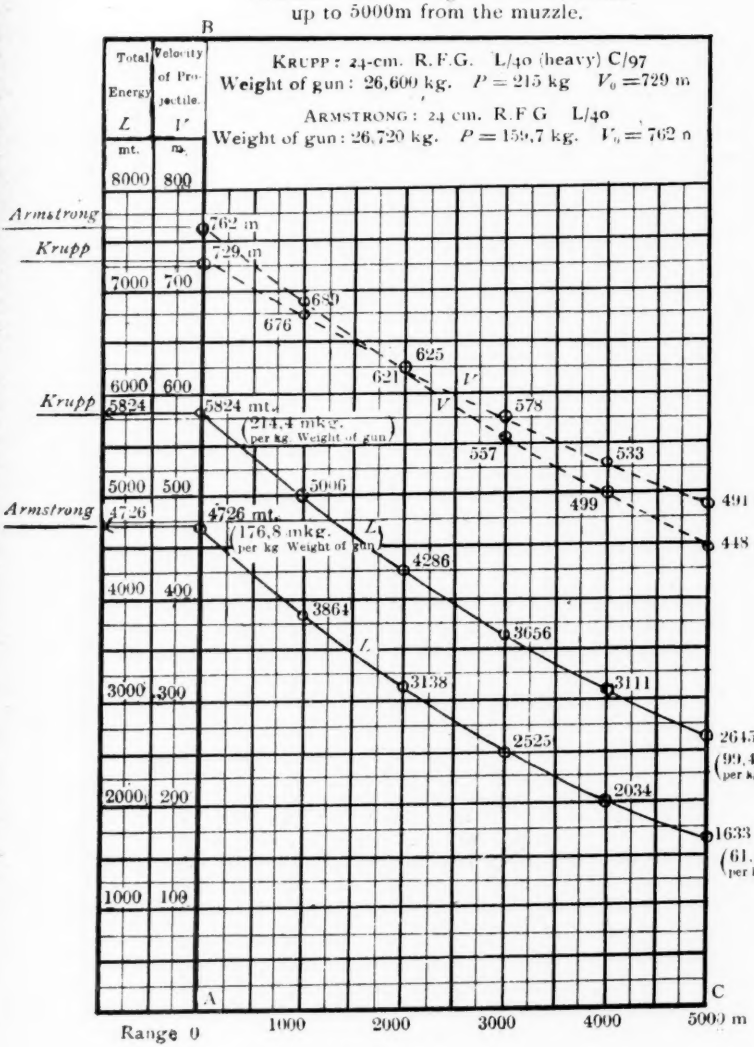


PLATE II.

Velocities and Energies of Projectiles
up to 5000m from the muzzle.

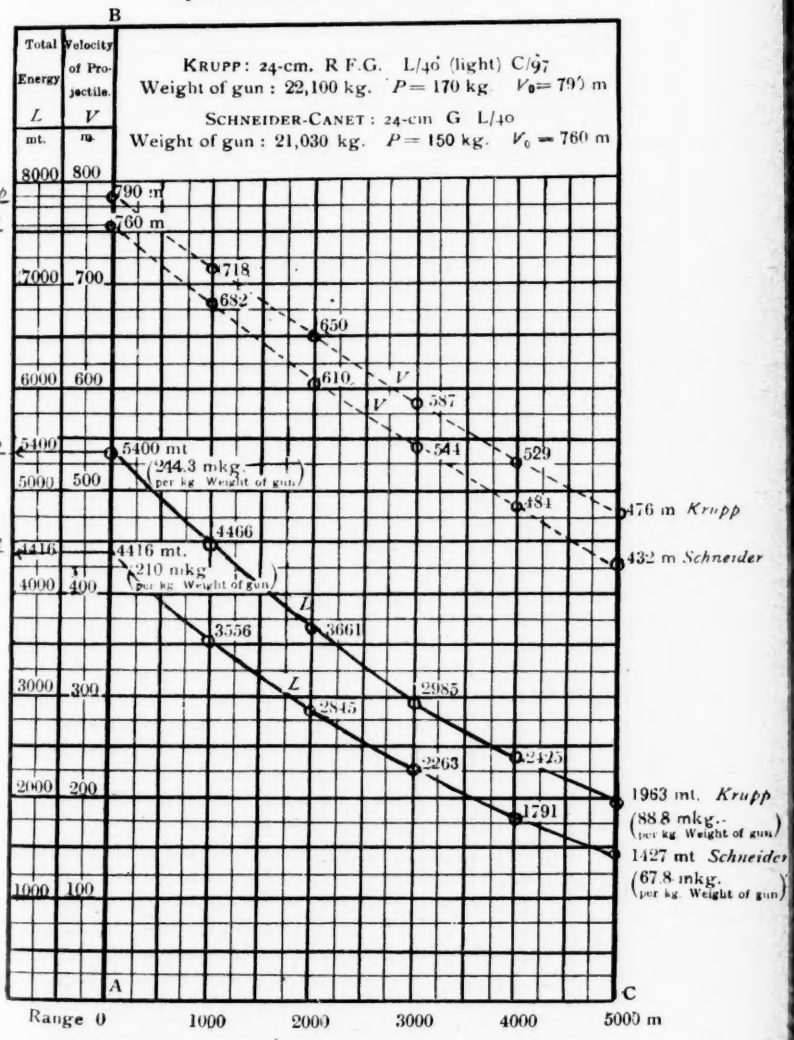


Plate Ia.

Power of Perforation of Harveyized Armour.

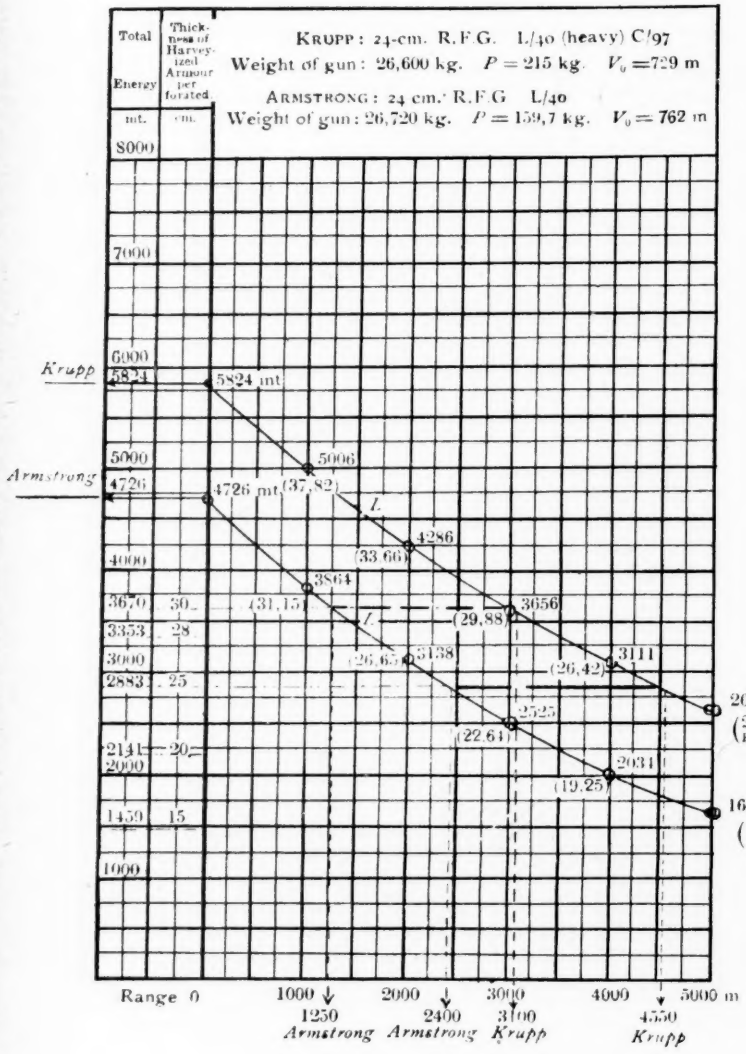
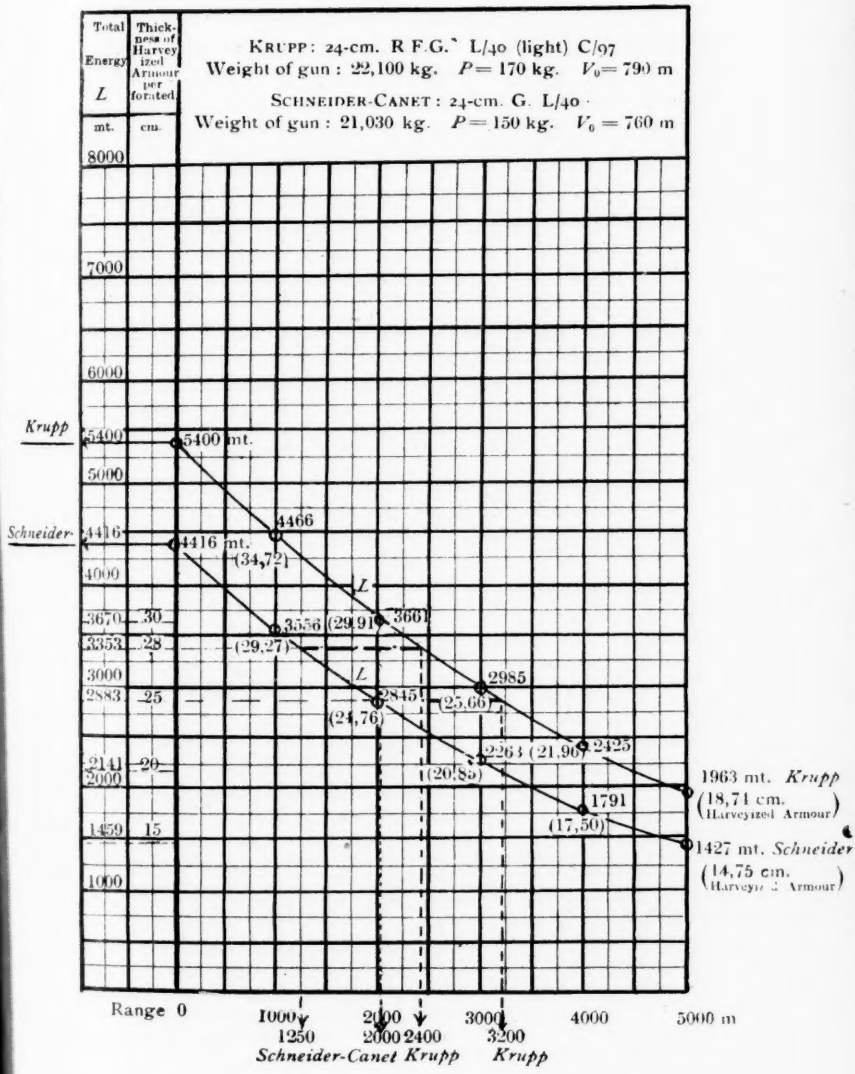


PLATE IIa.

Power of Perforation of Harveyized Armour.



MILITARY NOTES.

PRINCIPAL APPOINTMENTS AND PROMOTIONS DURING FEBRUARY, 1901.

Brevet Colonel E. W. D. Ward, C.B., from Lieut.-Colonel A.S.C., to be an A.Q.M.G. at Head Quarters, and to have the substantive rank of Colonel in the Army. Colonel L. W. Parsons from Colonel on the Staff for R.A. in South Africa, to be a Colonel on the Staff for Royal Artillery. Lieut.-Colonel C. Purchas, Ordnance Officer 2nd Class, to be temporary and local Ordnance Officer 1st Class, with the temporary and local rank of Colonel whilst serving as C.O.O. at Gibraltar. Lieut.-Colonel J. S. D'Aguilar, Staff Paymaster, to be Chief Paymaster, with the substantive rank of Colonel in the Army. The following Lieut.-Colonels to be Colonels, viz., R. J. F. Banfield, the Welsh Regiment; S. Grant, R.E.; B. Scott, C.I.E., R.E.; E. Glennie, R.E.; G. F. Wilson, R.E.; G. M. Bullock, the Devonshire Regiment; C. E. Yate, C.S.I., C.M.G., I.S.C. Colonel W. L. Christopher, C.B., I.S.C., is granted the temporary rank of Major-General whilst Commissary-General-in-Chief in India. Colonel F. J. Graves from h.p. to be A.A.G. for Imperial Yeomanry. Colonel (now Major-General) G. Simpson, C.B., I.C.S., to command 2nd Class District in India, and to have the temporary rank of Brigadier-General whilst so employed. Lieut.-Colonel and Brevet Colonel (local Major-General) F. W. Kitchener, the Prince of Wales's Own (West Yorkshire Regiment), commanding a Brigade in South Africa, to be a Major-General on the Staff. Colonel (local Major-General) J. W. Murray, commanding the Lines of Communication, Natal, to be a Major-General on the Staff. Colonel T. E. Verner, C.B., from 10th Regimental District (the Lincolnshire Regiment), to be D.A.G. and Chief Staff Officer, Lines of Communication, South Africa. Colonel (temporary Brigadier-General) A. G. Creagh, C.B., commanding a 2nd Class District in India, to be Major-General. Lieut.-Colonel and Brevet Colonel W. T. Shone, C.B., D.S.O., R.E., is granted the temporary rank of Brigadier-General whilst Colonel on the Staff for R.E. China Field Force. H.M. Charles I., King of Portugal and Algarves, K.G., to be Colonel-in-Chief of the Oxfordshire Light Infantry. Field-Marshal the Right Hon. F. S., Earl Roberts, K.G., K.P., G.C.B., G.C.S.I., G.C.I.E., V.C., Colonel Irish Guards, retains his position as Colonel Commandant (Supernumerary to the Establishment) of the Royal Regiment of Artillery, on appointment to the Colonelcy of the Irish Guards. Brevet Colonel J. H. E. Hinde from Lieut.-Colonel h.p. to be Colonel to command the 10th Regimental District (the Lincolnshire Regiment). Colonel E. G. H. Ravenhill from h.p. to be Colonel to command the 25th Regimental District (the King's Own Scottish Borderers). Colonel J. Leach from h.p. to be Colonel on the Staff for R.A. in India, and to have the temporary rank of Brigadier-General whilst so employed. Brevet Colonel G. N. Stevens from Lieut.-Colonel h.p. to be a Colonel on the Staff for R.A., and to have the substantive rank of Colonel in the Army. Colonel R. M. Barklie to be a Brigadier-General on the Staff to command the Troops in the Salisbury Plain District, and to have the temporary rank of Brigadier-General whilst so employed. Temporary Brigadier-General C. C. W., Lord Chesham to be Inspector-General of the Imperial Yeomanry, graded as a Major-General on the Staff, and to have the local rank of Major-General whilst so employed. Colonel J. M. Babington to be a Major-General on the Staff, and to have the local rank of Major-General whilst so employed. Lieut.-Colonel E. C. Knox, 18th Hussars, to be a Colonel on the Staff to command the 2nd Cavalry Brigade, South Africa, and to have the local rank of Colonel whilst so employed. Major and Brevet Lieut.-Colonel H. M. Lawson, R.E., to be a D.A.G., and to have the local rank of Colonel whilst so employed. Lieut.-Colonel C. J. Blomfield, D.S.O., the Lancashire Fusiliers, to be a Colonel on the Staff to command a Sub-District, and to have the local rank of Colonel whilst so employed. Lieut.-Colonel G. H. C. Hamilton, 14th Hussars, to be a Brigadier-General on the Staff to command

the 4th Cavalry Brigade, South Africa, and to have the local rank of Brigadier-General whilst so employed. Lieut.-Colonel G. M. Bullock, the Devonshire Regiment, to be a Colonel on the Staff to command a Sub-District, and to have the local rank of Colonel whilst so employed. Lieut.-Colonel P. C. E. Newbigging, R.F.A., to be Colonel. Lieut.-Colonel H. C. Sclater, A.A.G., R.A., Field Force, South Africa, is granted the local rank of Colonel whilst so employed. Colonel J. G. Dartnell, C.M.G., is granted the local rank of Brigadier-General in South Africa whilst Commandant of Natal Volunteers. Lieut.-Colonel W. H.-H. Waters, M.V.O., now a temporary Military Attaché, is granted the substantive rank of Colonel in the Army. Colonel E. H. Fitzherbert from h.p. to be Colonel to command the 8th (the King's Liverpool Regiment) and the 40th (the Prince of Wales's Volunteers, South Lancashire Regiment) Regimental Districts. Colonel W. D. Richardson, C.B., resumes the appointment of an A.A.G. Lieut.-Colonel C. R. Townley, the Suffolk Regiment, to be Colonel.

HOME.—*Memorandum of the Secretary of State relating to the Army Estimates for 1901-1902.*—The total of the Army Estimates for 1901-02 amounts to £87,915,000 while the number of men to be voted is 450,000.

The following table shows the comparison with the figures for the current year :—

	1900-01.	1901-02.
Vote A	430,000	450,000
Votes 1-16	£ 88,999,400 (including Supplementary Estimates)	£ 87,915,000

As regards Vote A (men), 220,000 may be regarded as forming the permanent establishment of the Army, the balance being temporary additions due to the war in South Africa and operations in China.

The £87,915,000 is accounted for as follows :—

	£
a. Permanent additions voted in 1900-01 and earlier years, including automatic increases	25,451,000
b. Permanent additions to be voted 1901-02	1,912,000
c. Temporary increases	2,322,000
d. War services	58,230,000

a. Permanent additions voted in 1901-01 and automatic increases :—

	£
As shown at page 6 of Army Estimates, 1900-01, the total for normal services and permanent additions amounted to	23,702,700

The Estimates for 1901-02 have also to allow for :—

1. Complete provision for new forces raised in 1900-01	655,000
2. Contribution payable to India towards the cost of Aden, as well as the transport of troops to and from India	230,000
3. Rise in prices of stores and fuel	350,000
4. Growth of Volunteer Force	180,000
5. Hutting for troops at home, and annuities for repayment of loans for works	280,000
6. Miscellaneous	53,300
Total	£25,451,000

b. Permanent additions to be voted, 1901-02 ... ... £1,912,000

These include :—

a. The formation of "garrison" battalions for service on the Mediterranean and other non-tropical stations abroad.

b. Measures affecting the Militia, Yeomanry, and Volunteers.

c. Provision of Staff for Army Corps, and re-organisation of Army Medical Services.

d. Extension of system of registration of horses and transport required on mobilisation.

e. New system of clothing throughout the Army.

The above measures, and others affecting Army re-organisation, will be fully dealt with on the introduction of the Army Estimates, so I refrain from explaining them in detail in the present memorandum.

c. Temporary increases £2,322,000

This represents the further instalment for the re-armament of our fortresses and for stores, to which allusion was made in the memorandum accompanying the Army Estimates for 1900-01.

d. War Services £58,230,000

The provision under this head is based on the assumption that for the first four months of the new financial year the field force in South Africa will be maintained at full strength, and that a gradual diminution will subsequently take place.

Provision is made for the transport home of the troops, and the gratuities payable on demobilisation, as well as the special war gratuity, which, though voted in the present financial year, will not, owing to the prolongation of the war, be paid to any large extent until 1901-02.

The explanations of the increases on the different Votes are as follows :—

Vote 1.—Pay, etc.

This vote shows a net increase, £3,207,500, of which £2,239,000 is due to war, and £968,500 to "normal" services.

The latter head covers :—

a. The pay, etc., of the new "garrison" battalions already referred to.

b. Two additional Indian native battalions for service at Singapore and Hong-Kong.

c. The further provision required for various increases voted in 1900-91.

d. The contribution to Indian revenues referred to in paragraph *a.* 2 on the preceding page, as explained in the papers recently laid before Parliament.

Vote 2.—Medical Services.

The increase on this vote amounts to £183,600, of which £58,700 is for war, and £124,900 for permanent additions. The bulk of the latter increase is for the "Re-organisation of the Army Medical Services," to which reference has been made.

Vote 3.—Militia.

Net increase £374,000. The provision for war services shows a decrease of £40,000, while the increase for permanent services amounts to £414,000. This is mainly accounted for :—

a. By a new system of consolidated bounties, estimated cost, £150,000.

b. By the formation of a new Militia Reserve, for which £250,000 is provided.

c. By the issue to Militia non-commissioned officers and men of the same rates of pay and extra-duty as are given to similar ranks in the Regulars, at a cost of £12,000.

Vote 4.—Yeomanry.

There is a net increase of £231,000 on this vote, but the increase as compared with the normal is £300,000, which is to provide for a considerable addition to the number of the force, and an extended period of training, accompanied by higher rates of allowances.

Vote 5.—Volunteers.

This vote shows an apparent decrease of £500,000, but there is in reality an increase of £330,000, as compared with the ordinary provision for this force.

The large growth of the Volunteer Force necessitates the provision for increased capitation and camp allowances, while a considerable sum, £150,000, has also been taken for the extended training of a certain number of battalions of infantry and batteries of artillery.

Vote 6.—Transport and Remounts.

This vote shows a decrease of £3,823,000, which arises entirely on war services. Money is taken in this vote for the transport of the troops to be brought away from South Africa. The only service requiring special mention is the additional provision under Sub-head D of £100,000 for registration of horses and transport to be available for military purposes in time of emergency.

Vote 7.—Supplies.

There is a net increase on this vote of £582,000, which is mainly due to the permanent additions to the Army already referred to. Provision is also made for the grant of the messing allowance to Militiamen during their annual training.

Vote 8.—Clothing.

The increase on the normal vote is £180,000, which is accounted for by the initial cost of the new system of clothing about to be adopted throughout the Army (including the Militia).

Vote 9.—Warlike Stores, etc.

The increase for normal services amounts to £2,600,000, of this sum £2,322,000 is due to the further instalment required for accelerating the re-armament of fortresses at home and abroad, while the balance is required to meet a general rise in the price of stores.

Vote 10.—Works, etc.

As compared with the normal vote for 1900-01 this vote, apart from war services, shows an increase of £283,300, being due to the provision of hutting for troops at home, and to increased annuities for the repayment of loans for works.

Votes 11 and 12.—Education and Miscellaneous.

There is nothing that calls for special mention in the case of these two votes, as, apart from war services, there is no change from the amounts taken in the current year's Estimates.

Vote 13.—War Office.

Apart from war services, this vote shows an increase of £5,000 which arises on Sub-head A, and is mainly due to the appointment of an additional Officer as Inspector-General of Recruiting, as well as a Deputy-Assistant Adjutant-General for Recruiting, to an increase in the pay of the Commander-in-Chief, and to an addition to the number of Officers attached temporarily for various staff duties.

Votes 14-16.—Non-Effective Services.

The net increase of £518,500 on these votes is due to charges in connection with the war. The only service calling for special notice is the provision, under Sub-head K of Vote 15, of a sum of £56,000 to cover the grant of pensions from the 1st April next to the widows and children of non-commissioned officers and men who have died as the result of active operations. The scheme is now being formulated under the direction of the Treasury.

ST. JOHN BRODRICK.

28th February, 1901.

Comparative Table showing length of Service of the Infantry Soldier in Foreign Armies. Compiled in the Intelligence Division, War Office, 1st January, 1901 :—

Country.	Total Duration of Liability to Military Service.	Duration of Service with Colours.	Periods of recall for Training.	Total Service passed with the Colours, including recalls.
	Years.	Years. Months.		Years. Weeks. Days.
Austria-Hungary ...	Active Army and Reserve ... 10 Landwehr ... ... 2 Landsturm { 1st Ban ... ... 5 2nd Ban ... ... 5 Total ... ... 22(*b*)	3 0 (*a*)	Three of 4 weeks each in Reserve of Active Army. One of 4 weeks in Landwehr. Four of 5 weeks each for those posted direct to Austrian Landwehr. Five of 5 weeks each for those posted direct to Hungarian Landwehr.	3 16 0 or 2 20 0 to 25
Belgium (*c*) ...	Active Army ... ... 8 Reserve ... ... 5 Total 13	28 months.	Active Army.—May be called up for 1 month during their fourth year of service. Reserve.—May be called up by Royal Decree in case of national emergency.	29 months.
Bulgaria ...	Active Army and Reserve ... 10 Reserve Army ... ... 7 National Militia { 1st Ban ... 4 2nd Ban ... 4 Total 25	2 0	Eight of 3 weeks each in Active Army Reserve. Seven of 3 weeks each in Reserve Army. Four of 1 week each in 1st Ban and four of 3 days each in 2nd Ban of National Militia.	2 49 12
Denmark ...	Line and its Reserve ... ... 8 Reserve ... ... 8 Total 16	0 6	Two of 30 days each in Line Reserve.	8 months.
France ...	Active Army and Reserve ... 13 Territorial Army ... ... 6 Reserve of ditto ... ... 5 Total 25	3 (*d*) 0	Two of 28 days each in Reserve of Active Army. One of 14 days in Territorial Army.	3 0 70 or 2 0 70 or 10 mths. 4 70
Germany ...	Landsturm, 1st Ban ... ... 3(*e*) Active Army and Reserve ... 7 Landwehr, 1st Ban ... ... 5 Landwehr, 2nd Ban ... ... 7(*f*) Landsturm, 2nd Ban ... ... 6 Total 28	2 0	Two of 8 weeks each in Reserve. Two of 8 to 14 days in Landwehr (1st Ban).	2 16 16 to 28
Greece ...	Active Army and Reserve ... 12 Territorial Army ... ... 8 Territorial Reserve ... ... 10 Total 30	2 (*g*) 0	Ten of 40 days in Active Army Reserve, and 2 (*h*) of 15 days in Territorial Army.	Nominally 3 years 2 months.
Holland (*i*) ...	Active Army ... ... 1 Reserve ... ... 6 Total ... ... 7 All young men of 25 then take part in a second drawing of lots to determine their liability to serve, or not, in the Schutterij, the strength of which is fixed at 2 per cent. of the population. Years. Schutterij ... ... 5 Reserve of Schutterij ... ... 5 Total 10	1 year. A small proportion 1 year 4 months.	One or two of 6 weeks each in Reserve of Active Army.	1 year 6 weeks to about 1 year 7 months.
Italy	Active Army ... ... 3 (Half the contingent only 2 years.) Reserve ... ... 5 Mobile Militia ... ... 4 Territorial Militia ... ... 7 Total 19	30 months. (*j*)	No fixed periods, may be called out whenever Minister directs.	Indefinite.

Comparative Table—cont'd.

Country.	Total Duration of Liability to Military Service.	Duration of Service with Colours.	Periods of recall for Training.	Total Service passed with the Colours, including recalls.
Norway ...	Line ... ... 6 Landvaern ... ... 6 Landstorm ... ... 4 Total 16	48 days.	Four of 24 days each in first, second, third, and seventh years.	144 days.
	Years.			
Portugal ...	Active Army ... ... 3 1st Reserve ... ... 5 2nd Reserve ... ... 7 Total 15	2 years.	Two of 30 days each, and two of 20 days each.	2 years 100 days.
	Permanent Army. Years. / Territorial Army. Years.			
Roumania ...	Active Army ... 7 / 5 Reserve ... ... 2 / 4	Permanent Army, 3 years. Territorial Army, 90 days.	In Reserve of Permanent Army for manœuvres only. In Reserve of Territorial Army, 8 days per month till efficient. Militia :—(1) Periodical inspections of 48 hours ; (2) 30 days, including manœuvres.	Indefinite.
	Years.			
	Militia ... ... 6 Landsturm ... ... 10 Total 25			
Russia ...	Active Army and Reserve ... 18 Imperial Militia... ... ... 4 Total 22	5 years. (*k*)	Two of 6 weeks each in reserve. Imperial Militia liable to be called out for two trainings of six weeks each.	(*l*) 3 years 12 weeks (not including training in Militia).
Servia... ...	Active Army ... ... 2 Reserve ... ... 8 National Army { 1st Ban ... 7 / 2nd Ban ... 7 Total 24	Years. Months. 0 8	Eight of 30 days each in Active Army Reserve. Seven of 15 days each in 1st Ban, and seven of 5 days each in 2nd Ban of National Army.	16 months 140 days.
Spain	Active Army ... ... 3 1st Reserve ... ... 3 2nd Reserve ... ... 6 Total 21	2 6 or 2 0	1st Reserve whenever considered necessary by War Minister. 2nd Reserve 6 or 4 weeks each. (*m*)	Indefinite.
Sweden (*n*)	Bevaring, 1st Ban ... ... 8 ,, 2nd Ban ... ... 4 Landstorm ... ... 8 Total 20	68 days.	One of 22 days in 1st Ban of Bevaring.	90 days.
Switzerland ...	Elite ... ... 12 (Cavalry 10). Landwehr ... ... 12 (Cavalry 14). Landsturm ... ... 6 Total 30	47 days.	Elite—At least four of 18 days, and an obligatory musketry course those years when not called out for training. Landwehr.—Two of 7 days.	133 days.
Turkey ...	Active Army and Reserve ... 6 Redif (Landwehr) ... ... 8 Mustahfiz (Landsturm) ... 6 Total 20	3 (*o*) 0	Active Army Reserve, 6 weeks periodically. Redif, four of 1 month each (biennially).	Indefinite.
United States	Army (Voluntary enlistment) 3 State Militia from 18 to 45 years of age. (*p*)	3 years.	Army.—Nil. Militia.—The minimum training in New York State is five compulsory drills, twelve evening drills, and certain parades annually.	

REMARKS.

a Two years for those posted direct to Landwehr.

b (1.) This shows ordinary course of service.

(2.) Landsturm liability is from 19 to 42 years of age.

(3.) Men posted direct to Landwehr serve with Colours two years, in Landwehr Reserve ten years, and in Landsturm as shown.

c Army is recruited by annual contingents, the strength of which is fixed yearly by a special law. Numbers for the annual contingents are obtained by drawing lots among the men who during that year will attain the age of 20. Men who draw a number which renders them liable to serve can obtain a substitute on payment of £64.

d 1 or 2 years for certain categories, who are excused from serving the whole 3 years. Those who serve for 1 year, practically only do 10 months' service, but they are liable to perform 4 weeks' training in their 3rd year of service.

e Commences at 17 years of age.

f To 31st March of year in which they complete 39 years of age.

g Usually reduced.

h These trainings rarely take place.

i A Bill is before the Dutch Parliament to alter terms of service to 8 years in Active Army and Reserve, and 7 years in Landwehr.
The Schutterij is to be abolished.

j 18 months for those who do two years' service only.

k Under ordinary conditions: varies from 4 to 1 for men with certain educational qualifications.

l Three years is the average colour service, on paper; but as the number of men with the necessary educational qualifications is comparatively small, the actual average length of colour service is nearer 4 years.

m This has never been done.

n The scheme for the re-organisation of the Swedish Army, introducing general conscription, to be laid before the Riksdag next session, allows for a total service of 365 days.
For Infantry service with colours 245 days; third, fourth, and fifth years, 35 days each; and ninth year, 15 days. Total 365 days.

o Reduced on payment of a tax: frequently extended.

p Is actually recruited by volunteering, but conscription may be enforced, and was in the Civil War. The voluntary service varies in different States; in New York it is for five to seven years.

INDIA.—The following communication from Captain De Prée, R.H.A., may be of interest:—"The following records of a batch of Mannlicher cartridges may be of some use to the soldier sportsman, even if of no interest from a military point of view. Early in the spring of 1898, intending to shoot in the East African Protectorate, I purchased from Messrs. George Gibbs, gunmakers, 1,100 Mannlicher cartridges loaded with Schwab powder and various patterns of bullets. These were sent out for me to Bombay. As I was unable to get my leave at that time, the cartridges spent the year in a warehouse in Bombay.

"In April, 1899, Captain Hankey, R.H.A., and I, took them out to the East African Protectorate, where we shot every kind of game with them, from the largest bull elephants to ducks on the rivers. After six months in that country I had some 300 left, which I took back to Rawul Pindi. On leaving India at the beginning of 1900, I left these behind. Captain Roberts, R.G.A., took some to Chitral, where he was most successful with them against the ibex. And this mail a letter has arrived from Captain Cairnes, R.F.A., in which he describes a shoot with them in the Siwaliks.

"The following is an extract from this:—'Once more I decided the Mannlicher is the best. Both sambur were long shoots, 250 yards and 300 yards, but I hit both in the shoulder, and they did not go 15 yards. I only missed one shot with the Mannlicher and that was through over-estimating the distance, as the beast was standing in the shade on the next ridge. I was using the cartridges I got from you, and they are still perfectly good.'

"The cartridges have been for over three years in every temperature and at every elevation from the sea level at the equator to far up the Himalayas without a failure, and I think it would be hard to devise a more searching test in the ordinary course of events."

FRANCE.—The nature and duration of the autumn manœuvres for 1901 have been fixed as follows in the *Bulletin Officiel* :—

I. Army Manœuvres.

Two army manœuvres will take place under the chief direction of General Brugère, Vice-President of the *Conseil supérieur de la Guerre.*

a. One will be in the Eastern District, at which the Ist, IInd, VIth, and XXth Army Corps and four cavalry divisions (the 2nd, 3rd, less the 1st Cuirassier Brigade, 4th, and 5th) will take part.

b. One in the Western District, at which the XIth and XVIIIth Army Corps, the 34th Infantry Brigade of the IXth, and the 46th of the XIIth Army Corps, the 1st Cuirassier Brigade of the 3rd Cavalry Division, and the 7th Hussar Regiment will take part.

II. Brigade Manœuvres.

Other army corps will execute brigade manœuvres for a period of 12 days, including the date of assembly and return.

III. Cavalry Manœuvres.

Two cavalry divisional manœuvres will take place. At the first the 7th Cavalry Division and the 7th and 8th Cavalry Brigades will take part. In the second the 5th Cuirassier and the 6th Dragoon Brigades, the 6th Cavalry Division and the 14th Cavalry Brigade will take part. No brigade evolutions will take place this year. In addition to the cavalry already mentioned, the brigades of corps cavalry and the 2nd, 3rd, 4th, and 5th Cavalry Divisions will assist at the army manœuvres.

IV. Fortress Manœuvres.

Fortress manœuvres will take place at the camp at Chalons.

V. General.

The direction and organisation of the Army, the Cavalry and the Fortress Manœuvres will form the subject of special instructions. Brigade manœuvres will be carried out in conformity with the General Instructions of the 18th February, 1895.

The 4th Battalions of regiments belonging to the IXth, Xth, and XIIth Army Corps, stationed at Paris, those of regiments belonging to the VIth, VIIth, and XXth Army Corps which garrison fortified places at the frontier forts, as well as those of regiments of the XIth and XVIIIth Army Corps, will not participate in army or brigade manœuvres. All the other 4th Battalions will march with their regiments.

It is strictly forbidden, in all army corps carrying out brigade manœuvres, to modify the nature of the manœuvres laid down for each unit, or to assemble in greater strength than that which that unit consists of.

Under the reservations laid down for artillery horses by the ministerial despatch of the 30th March, 1900, and for thoroughbred horses by the despatch of the 14th August, 1900, it is still forbidden to take troop horses aged under 7 years to manœuvres of any kind.

A group of two field batteries will, as a rule, be attached to each brigade in army corps carrying out brigade manœuvres. In addition to the manœuvres mentioned in the present circular, manœuvres will be carried out in the Alps and Vosges, as well as in Algeria and Tunis. These manœuvres will later form the subject of special instructions.

VI. Staff Rides and Cadres Manœuvres.

Staff rides will be carried out in each army corps and in the Military Government of Paris. In the XIVth and XVth Districts the staff rides of army corps will be replaced by special rides which will be regulated by instructions that will be issued later. Two manœuvres with active divisional cadres, and one with reserve divisional cadres will be carried out in all army corps, with the exception of the VIth and VIIth. A manœuvre with fortress cadres will, in addition take place in the Xth Army Corps. In both the VIth and VIIth Army Corps there will be three manœuvres with active

and one with reserve divisional cadres. The Lyons district brigade will carry out a brigade cadres manœuvre. General officers commanding army corps who are desirous of organising an army corps cadres manœuvre, will send in a scheme by the 15th March. Three brigade cadres manœuvres will be carried out in the XIXth Army Corps, and one in the Tunis Occupation Division.

The 7 cavalry divisions and the 6 districts of permanent inspection of cavalry will each carry out a divisional cadres manœuvre.

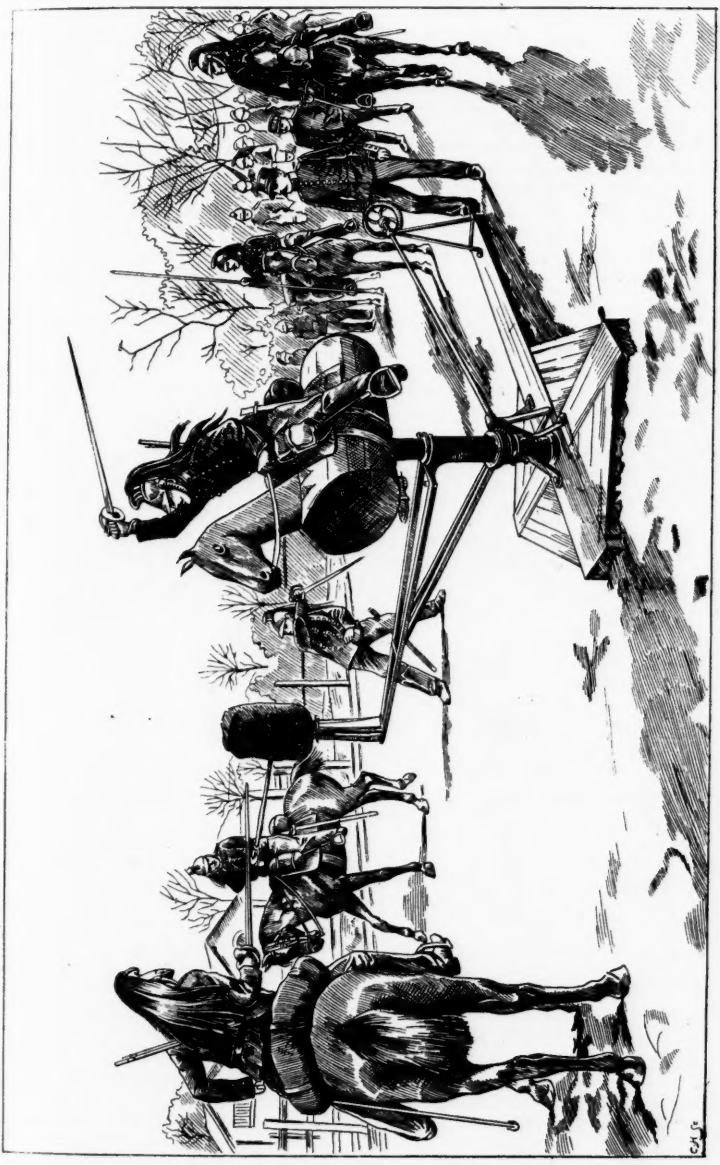
Researches with regard to gunnery questions and to gunnery instruction are carried out in the artillery by means of :—

1. A board for the practical study of gunnery residing at Poitiers. This board is charged with the study and investigation, according to lines approved by the Minister of War, of the best methods to employ in the firing of field guns, and to submit to him proposals with a view to the laying down of, and to the improvement of, the regulation methods.
2. A practical course of field gunnery established at Poitiers, with the object of practising captains in the application of the regulation methods of field gunnery, and, in addition, to prepare a certain number of majors in conducting the fire of several batteries and in the supervision of practice-camps.
3. A board, with headquarters at Toul, for the practical study of the duty of artillery in the attack and defence of places.
4. A practical course of siege and position artillery gunnery established at the camp of Chalons, and under the supervision of the board mentioned in paragraph 3. Officers of foot artillery battalions, and officers attached to the artillery staff, and to that of fortified places, in the event of war, undergo this course.
5. A board, established at Toulon, for the practical study of coast artillery, and charged with the study of methods of gunnery, experimenting with measuring instruments and *matériel*, and, in a general way, to carry out all investigations regarding coast artillery.
6. A practical course of coast artillery, organised at Toulon, and to which a certain number of artillery officers are sent, who, in the event of mobilisation, would be called upon to fill coast commands.

—*Revue du Cercle Militaire.*

The fencing horse, devised by Fencing-Master Adjutant Monlun, of the 3rd Regiment of Dragoons, at Nantes, presents the peculiarity that after one has seen it in operation he immediately asks himself why it was not invented a long time ago ; it is so simple. But such simplicity does not exclude ingenuity, and in nowise robs M. Monlun of any of the merit of his very practical invention.

Up to the present, recruits have been exercised in the manipulation of the sword in quite a rudimentary way, especially at the inception of their instructions. The young recruit was placed upon any sort of a wooden horse whatever, with stationary dummies arranged around him within easy reach of his hands, one to the right, one to the left, one in front, and one behind. Then he was ordered now to strike one and then another, by cut and thrust, according to the progression of the theory involved. This exercise was tiresome and monotonous, and consequently did not give the result desired. With Adjutant Monlun's mechanism all this is changed. The tedious exercise of former times becomes exciting and pretty closely resembles real fighting. The soldier's *amour-propre* enters into it, and something of the unexpected always occurs. The instructor himself, in manipulating the controlling wheel, becomes warmed up and ends by identifying himself with the dummy, which he turns in every direction and every position around his pupil. The latter, while complying with the regulations and with the orders of the instructor, introduces into his work an ardour and an

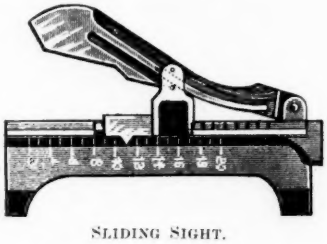


interest that have hitherto been unknown, and that, moreover, are shared by the spectators, officers, non-commissioned officers, and young soldiers who are waiting their turn and are impatient to enter into competition with their tow-stuffed adversaries.

But the movable apparatus is not employed solely for the instruction of the pupil placed in the centre. Not only does it advantageously replace the five or six stationary dummies of the old system, but serves also as a target for half a dozen combatants, on foot or on horseback, armed with lath or lance, who, outside of the circle, lie in wait for it, strike it, prick it, split it, and transpierce it with a conviction that gives one pleasure to witness. Let us add that the Minister of War, through a circular of 13th September, 1900, authorised the commanders of cavalry corps to employ the fencing horse on condition that the expenses thereof be paid by the private fund of the regiment.

The price, 246½ francs, is not of a character to frighten anyone, and if financial reasons have prevented the Minister from offering this mechanical horse gratuitously to the entire French cavalry, it is to be hoped at least that a number of colonels will decide to purchase it.—*For the above particulars and the engraving we are indebted to La Nature.*

GERMANY.—The 1888 model of the German Army rifle, which was rather hastily adopted after the invention of smokeless powder, has proved defective in more than one respect, if *L'Illustration* is to be credited. The breech closing and the repeating mechanism leave much to be desired. Dust too easily enters the lower opening of the magazine; the bayonet is too short; the rear sight with its vertical leaf through which the line of sight passed by different notches is too complex: the walls of the rifle-bore are not strong enough; and the outer case or barrel cover is useless and even a source of injury. This outer case or barrel, the chief characteristic of German small-arms, is a tube of sheet metal which surrounds but does not touch the



SLIDING SIGHT.

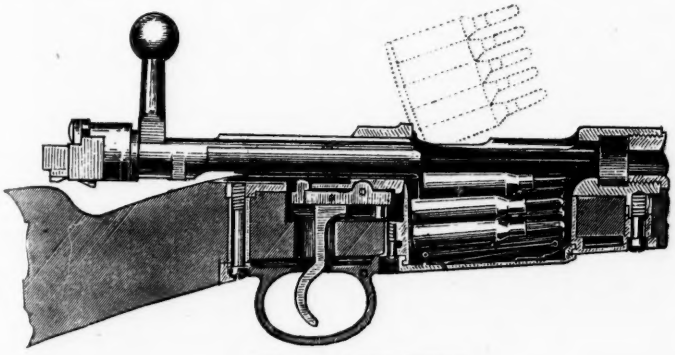
barrel, so that a small space is left which serves to permit the heated barrel to expand freely without being in any way checked by the stock. It was thought that by means of this construction the dispersion which results from a bending of the barrel would be reduced. In practice, the defects of the barrel-cover were soon apparent; for it was found the cover increased the weight of the weapon and actually prevented a rapid cooling of the overheated barrel.

It is claimed, the new gun which will be adopted is free from the defects mentioned. The weapon is of the same calibre as the old piece, so that like cartridges can be used: that, however, is the only essential point in which the two guns resemble each other. The barrel-cover is discarded; the walls of the barrel, much stronger than those of the old gun, are made up of a series of cylinders or truncated cones, from the muzzle to the breech.

The rear sight, made after an entirely new design, comprises a sight bed or foot on which a slide moves, which is provided with an index and with two ears, the upper parts of which are each formed with two lugs in the same vertical line. The leaf of the rear sight, curved in form, is recessed on its upper face and is formed with two grooves on its sides. The two lugs or tenons of each ear of the slide move in the grooves to

raise or lower the leaf. There is but a single sight notch, located at the free end of the leaf. The sides and base of the bed are graduated in hectometres.

The magazine, similar to the magazines of all Mauser guns, consists of a sheet-metal case integrally formed with the trigger-guard, mounted adjacent to the breech casing, and wholly embedded in the wooden stock. Five cartridges are arranged in quincunx form (by which the depth required is reduced to a minimum) and rest on a carrier actuated by a spring. The uppermost cartridge constantly bears against one of the edges of the magazine opening, but is prevented from passing the edge by lateral springs which must be withdrawn when the cartridges are introduced. The cartridge can drop below the lip of the carrier only at the forward end, when driven by the bolt into the barrel-chamber. The Mannlicher loader used in the old gun is discarded for the Mauser loading-strip which holds the cartridges only by the bottom. To fill the magazine, the loading-strip with its cartridges is placed on the breech-casing, as shown by the dotted lines of one of our illustrations. By pressing upon the upper cartridge with the thumb, all the cartridges instantly slide into the magazine. The empty strip is then removed.



SECTION OF THE BREECH.

The 20-centimetre dagger-bayonet of the old weapon has given place to a 50-centimetre sword-bayonet provided with a flaring end. For the infantry and chasseurs the back of the bayonet is serrated to form saw-teeth. Prospective colonial expeditions have probably led the German War Office to lengthen the bayonet. It should be remarked that the bayonet is fixed only to the forestock, so that its weight can in no way affect the barrel.

The new gun weighs 4 kilogrammes 100 grammes (without the bayonet, which weighs 430 grammes). Its extreme range is 4,000 metres. At 100 metres 80 centimetres of dry pine can be pierced; and at 1,800 metres 50 centimetres of dry pine can be penetrated. At 300 metres 7 millimetres of iron can be pierced. But at no distance has it been possible to penetrate 9·5 millimetres of good steel. The velocity of the projectile at 25 metres from the muzzle is 620 metres per second. The ballistic value of the gun is not greater than that of the model of 1888.—*Scientific American.*

The official accounts of the recruiting operations for 1899 were presented to the German Reichstag on 14th November last. The following were the results:—The number of young men who arrived at the military age amounted to 716,998. By adding those who were put back in 1898 (486,978), in 1897 (362,568), and in the previous classes (130,216), 1,696,760 men were obtained as the total number of the recruiting resources. The classification was made as follows:—

Unfit for service		43,196
Exempt from service...		1,245
Failing to appear		192,024
Put back		579,429
Emigrants, compelled to serve abroad		427,586
Enrolled in the Territorial Army	Combatant (*a*) ...	216,880
	Non-Combatant (*b*)	4,591
Enrolled in the Navy		5,486
Assigned to the Recruiting Reserve	Army	82,733
	Navy	1,076
Attached to 1st Ban of the Landsturm		112,839
Fit, but in excess of establishment		5,187
Enlisted as Volunteers in the Army (*c*)		23,266
„ „ „ Navy		1,222
Total		1,696,760

The number of young men enlisting in the Army before the military age amounted to 21,189. By adding to these numbers those marked (*a*), (*b*), and (*c*), the total contingent of men enrolled during 1899 amounts to 265,926 men.

With regard to education, only 213 of those called out could neither read nor write.—*Bulletin de la Presse et de la Bibliographie Militaires.*

A Cabinet Order, dated 12th February, regulates the Grand Manœuvres for 1901 as follows :—

The Ist (Berlin) and the XVIIth (Danzig) Army Corps will manœuvre against one another in the presence of the Emperor. The XVIIth Army Corps, which will be reinforced by the 19th Infantry Brigade, by the 3rd Horse Grenadier Regiment and by the 20th Field Artillery Regiment, will be made up to 3 infantry divisions. Four cavalry divisions (A, B, C, and D) will be organised from the Ist, IVth, VIIth, and XVIIth Army Corps, respectively. The A Cavalry Division will execute special manœuvres on broken ground, whilst the B, C, and D Cavalry Divisions will manœuvre in the camps of instruction at Hammerstein, Alten-Grabow, and Senne.

The units of the B Cavalry Division will not take part in the brigade and divisional manœuvres of its army corps. The 3rd Guards Cavalry Brigade will be attached to the 38th Division during the whole of the manœuvres. Both manœuvring army corps will have a balloon section. Pioneer grand manœuvres will take place between the Elbe and the Saale. Cavalry manœuvre-rides will take place in the Ist, IInd, IIIrd, Vth, VIth, VIIIth, XIth, XIVth, and XVIth Army Corps. All the troops must be back in their quarters by 30th September.—*Die Vedette.*

MEXICO.—The *Mexico Militar* states that the Mexican cavalry are provided with petards, or hand grenades, each consisting of a cartridge of Nobel dynamite containing three-parts nitro-glycerine and one part silica, and weighing about 4 ozs., enclosed in a tin case 5½ inches long, 1¼ inches broad, and 1 inch deep, which has a small hole at one end stopped by a piece of wood. To the wooden stopper is attached a tape by means of which it can be quickly removed ; and when the grenade is about to be used a percussion fuse takes the place of the stopper. The advantage of this is that before the wooden stopper is removed it is almost impossible for the grenade to explode ; a violent blow with a hammer, for instance, will have no effect upon it, and when placed in a flame the cartridge will simply smoulder away without exploding. Only a detonation, such as that caused by the discharge of the percussion-fuse or of a firearm close to it will explode the grenade. One grenade is sufficient to blow up a telegraph post ; more are required for blowing up part of a railway line, the number used being regulated by the length of line it is desired to blow up, the explosive effect being added to by covering the grenades with earth or stones. For making a breach in a wall the grenades are suspended from it by a thread ; other methods for using them in warlike operations will readily suggest themselves. During the months of November and December some Mexican military students and two regiments of cavalry were

instructed in the various methods and exercised in their use, although, for economy's sake, during the exercises some few men carried out the operations while the others looked on.

RUSSIA.—The number of recruits required for the Russian Army and Navy in 1900 was estimated at 297,100. The number of men born in the year ended November, 1880, and therefore liable for service in 1900, was 1,012,629; to these must be added 20,601 men who had no certificate of birth, but who were judged to be of service age, and 97,658 men whose cases stood over from previous years, making a grand total of 1,130,888 men. The actual number of men who joined the colours was 293,131, in place of the 297,100 estimated; there is, however, nothing exceptional in this deficiency. The men who failed to answer the call numbered 44,440, and of these 10,821 were Jews, forming nearly 25 per cent. of the total number of Jews called up. The total number of men examined by the recruiting committees was 847,420.

SPAIN.—The *Diario Oficial* publishes a Royal order calling up 30,400 recruits of the Spanish Army on 1st March. They will be distributed so as to bring up the strength as follows:—Halberdiers, 255; Royal College, 150; infantry, 56,713; cavalry, 13,116; artillery, 14,136; engineers, 5,180; administration, 1,466; medical service, 881; topographic brigade, 386; Volunteer Militia of Ceuta, 178; company at Melilla, 90; drill establishments, 504; in hospital, 546; military prison of Mahon, 120; Maria Christina College, 50; Ministry of War, 339—total, 94,104. The Line regiments of the Peninsula will be 707 strong, and those in Africa 1,050; each battalion of Chasseurs will consist of 400 men; cavalry regiments of from 410 to 460 men; horse artillery regiments with 9-centimetre guns, of 406 men; with 8-centimetre guns, 374; with mountain guns, 556. In order to reduce the total strength to 80,000 men, a certain number of men will be sent to their homes after the recruits have had two months' drill.—*Times*

UNITED STATES.—The United States Army has just been undergoing a process of re-organisation, and the Army Bill settling the effectives of the American Forces was accepted by Congress on the 2nd February last. According to this Bill, the United States Army is organised on the following basis:—

Cavalry.

This arm consists of 15 regiments, instead of 10 as formerly. Each regiment will have 3 squadrons of 4 troops each, and will consist of:—1 colonel, 1 lieut.-colonel, 3 majors, 15 captains, 15 first lieutenants, 15 second lieutenants, 2 veterinary-surgeons, 720 troopers (not including staff and musicians) at the lowest, and 1,200 at the highest effective.

The composition of each troop is as follows:—1 captain, 1 first lieutenant, 1 second lieutenant, 1 sergeant-major, 1 quarter-master-sergeant, 6 sergeants, 6 or 8 corporals, 2 cooks, 2 farrier-sergeants, 1 saddler, 1 muletier, 2 trumpeters, and 34 or 76 men.

Consequently the whole cavalry effective (not including officers, staff, and musicians) varies from 10,000 lowest to 18,000 highest standard.

Artillery.

Is made up of 12 instead of 5 regiments, and consists of 1 officer commanding the artillery, chosen by the President from the colonels of this branch of the Service, 14 colonels, 13 lieut.-colonels, 39 majors, 195 captains, 195 first lieutenants, 195 second lieutenants, 21 sergeant-majors, having the rank and pay of infantry regimental sergeant-majors, 27 sergeant-majors having the rank and pay of infantry battalion sergeant-majors, 1 electrician sergeant-major at each coast artillery post having electrical apparatus, 30 field and 126 coast batteries. The strength of the artillery, rank and file, should not exceed 18,920 men, not including the electrician sergeant-majors.

Field batteries and companies of coast artillery will have the organisation at present provided by law for a battery of artillery, viz. :—5 officers, 11 non-commissioned officers, 2 trumpeters, 2 artificers, and 60 men—total 80.

Engineers.

The Corps of Engineers will consist of 3 battalions, instead of 1, of 4 companies each. Each company will have the following composition, viz. :—1 first sergeant, 1 quartermaster, 8 or 12 sergeants, 10 or 18 corporals, 2 drummers or buglers, 2 cooks, 38 or 64 soldiers of the 1st, and 38 or 64 of the 2nd Class. The total effective of the Engineers varies from 1,200, lowest, and 1,968, highest, standard.

Infantry

will consist of 30, instead of 25, regiments of 3 battalions of 4 companies each.

Each infantry regiment will consist of 1 colonel, 1 lieut.-colonel, 3 majors, 15 captains, 15 first lieutenants, 15 second lieutenants, 1 sergeant-major, 1 quartermaster-sergeant, 3 battalion sergeants, and 2 colour-sergeants.

The composition of the company will be as follows :—1 captain, 1 first and 1 second lieutenant, 1 first sergeant, 1 quartermaster-sergeant, 4 or 6 sergeants, 6 or 10 corporals, 2 cooks, 2 drummers or buglers, 1 artificer, and 48 or 127 men. The regimental lowest effective, not including officers and staff, will therefore be 780, and the highest effective 1,800 men. The total infantry effective varies from 23,400 to 54,000.

Signallers

consist of 1 officer commanding, with the rank of brigadier-general, 1 colonel, 1 lieut.-colonel, 4 majors, 14 captains, 14 first lieutenants, 80 first-class sergeants, 120 sergeants, 150 corporals, 250 soldiers of the 1st, 150 soldiers of the 2nd Class, and 10 cooks—altogether 760 rank and file.

General.

In adding up the numbers given above, it is apparent that the Regular Army will have, in round numbers, a minimum effective of 55,000, and a maximum one of 74,000 men. The Army Bill also provides for the formation of native Philippine battalions and squadrons. These will be officered by officers of the Regular Army, who will have the rank and pay of the rank immediately superior to that they actually hold, during the whole of their service with these native corps—thus captains will have the rank of majors, first lieutenants that of captains, and so on. The President is also authorised to organise a provisional native infantry regiment of 3 battalions, to serve at Porto-Rico.

At the same time, the strength of the native troops should never exceed 12,000, and the effective of all the forces, including native troops, may never exceed 100,000 men.

When the Army Bill is put into force, it will necessitate the appointment to the Army of the following additional officers :—

Arm.	Colonels.	Lt.-Cols.	Majors.	Captains.	1st Lieuts.	2nd Lieuts.
Cavalry	5	5	15	85	65	105
Artillery ...	7	6	18	83	83	97
Engineers ...	—	—	—	5	10	18
Infantry ...	5	5	15	100	50	150
Signalling Corps	—	—	3	9	12	—

Administrative Corps, Commissariat, etc., will be equally increased, thus the Medical Corps will be increased by 129 more surgeons.

In 1897-98, the effective of the Regular Army (N.C.O.'s and men) of the United States was as follows :—

Cavalry	6,010
Artillery	3,934
Engineers	495
Infantry	12,871
Signalling Corps	49
Medical Corps	710
West Point Detachment...	214
Other Branches of the Service	763
Total	25,046

By comparing these with the latest numbers, it is seen that the strength of the United States Regular Army is doubled by the minimum and trebled by the maximum effective. The Artillery has undoubtedly benefited most by the recent change, having been increased from a total of 3,934 to one of 18,920 men.—*Revue du Cercle Militaire.*

NAVAL AND MILITARY CALENDAR.

FEBRUARY, 1901.

1st (F.) Her late Majesty's body was removed from Osborne to Portsmouth on the "Alberta," the course to Portsmouth being lined with British and foreign battle-ships, which fired salutes.

" " H.I.M. the German Emperor appointed the Duke of Cornwall and York Rear-Admiral *à la suite* of the German Navy.

" " Ex-President Pretorius surrendered to the British.

2nd (Sat.) Her late Majesty's body was brought to London and conducted from Victoria to Paddington by an imposing naval and military procession. On arrival at Windsor the body was removed to St. George's Chapel, where the funeral service was held.

" " Lord Kitchener dispatched 7 columns to clear the Eastern Transvaal, under General French.

" " A post at Modderfontein was captured by the Boers.

4th (M.) H.M. the King addressed messages to his People, to the Colonies and Dependencies, and to the Princes and People of India.

" " Her late Majesty's coffin was placed in the Mausoleum at Frogmore.

" " General French captured a 15-pounder from the Boers.

" " The Government accepted the offer of Australia to supply 2,000, instead of 1,000, men for service in South Africa.

5th (T.) H.I.M. the German Emperor conferred the Order of the Black Eagle on Earl Roberts.

6th (W.) H.I.M. the German Emperor left England for Germany.

" " The War Office announced that 30,000 additional mounted troops would be sent to South Africa.

" " The Boers cut the Delagoa Railway, 30 miles from Lorenço Marques.

" " General Smith-Dorrien was attacked by Botha at Bothwell, with 2,000 Boers, who were beaten off. The Boers lost 25 killed and several wounded. British casualties 24 killed, 53 wounded.

7th (Th.) H.M.S. "Terpsichore" commissioned at Chatham for Cape station.

8th (F.) Lord Methuen made large captures of horses and cattle at Petrusberg, and near Vryburg.

9th (S.) Launch of Torpedo-boat Destroyer "Ostro" from Schichau Yard at Elbing, for Italian Navy.

11th (M.) H.M.S. "Venus" arrived at Plymouth from Mediterranean.

12th (Tu.) H.M. the King conferred the Order of the Garter on H.M. Queen Alexandra.

12th (Tu.) General French captured a Boer convoy of 50 wagons, 15 carts, and 45 prisoners.
13th (W.) A Contingent of Strathcona's Horse arrived in England from South Africa.
" " A new province was formed on the N.W. Frontier of India.
14th (Th.) H.M. the King opened Parliament in State.
" " De Wet crossed the Orange River into Cape Colony at Zand Drift, but was engaged by Colonel Plumer, and lost 20 wagons with ammunition, a Maxim gun, 20 prisoners, and over 100 horses.
15th (F.) H.M. the King inspected Strathcona's Horse at Buckingham Palace, presented the men with medals, and handed a King's Colour to the regiment.
" " A Russian Force was attacked by Chinese near Shan-hai-Kwan, and lost 4 officers, and 40 men killed.
19th (Tu.) Launch of first-class battle-ship "Russell" from Palmer's Yard at Jarrow-on-Tyne.
" " H.M.S. "Phœbe" commissioned at Devonport for Australia.
" " The Capital of the Ogaden Somalis was seized by a British Force.
20th (W.) H.M.S. "Blake" left Plymouth with Relief Crew for "Royal Arthur."
" " The Boers derailed a supply train which preceded one in which Lord Kitchener was travelling.
21st (Th.) Launch of first-class armoured cruisers "Good Hope" from the Fairfield Yard, at Govan, and the "Bacchante" from the yard of John Brown & Co., at Clydebank.
" " Lord Methuen defeated the Boers under De Villiers, and Liebenberg at Haartbeestfontein. The enemy left 18 dead on the field. British casualties, 16 killed, 34 wounded.
23rd (Sat.) H.M.S. "Hood" left Plymouth for Mediterranean.
" " H.M.S. "Terpsichore" left for Cape.
" " Launch of first-class battle-ship "Césarevitch" from the Forges et Chantiers de la Méditerranée, La Seyne, Toulon, for Russian Government.
" " Colonel Owen engaged De Wet near Hopetown, and without loss captured a 15-pounder, a pom-pom, 50 prisoners, and a quantity of ammunition.
" " General French reported that Botha with 5,000 Boers was in flight, that 282 Boers had been killed and wounded in action, and that 56 prisoners had been taken, 182 surrenders, also that one 15-pounder, 462 rifles, 160,000 rounds of ammunition, 3,500 horses, 74 mules, 3,500 oxen, 187,000 cattle, 155,400 sheep, 1,070 wagons and carts had been captured from the enemy.
" " The Boers attacked a British garrison at Fish River Station, but were driven off by an armoured train.
" " An Army Order was issued for the formation of a Royal Garrison Regiment.
24th (S.) A party of Yeomanry surprised and captured a Boer post at Bethlehem.
27th (W.) General French captured 3 guns, a quantity of live stock and vehicles, and 300 Boers surrendered to him.
28th (Th.) The Sultan, on the representations of the Powers, ordered 50,000 Turkish troops to concentrate near Kustendel on the Bulgarian frontier.
" " Supplementary Estimates were issued for an additional £3,000,000 to meet the expenses of the War, and £1,250,000 for the Navy.

FOREIGN PERIODICALS.

NAVAL.

ARGENTINE REPUBLIC.—*Boletin del Centro Naval.* Buenos Aires: January, 1901.—"The Law of Conscription for the Fleet." "Calculation of the Ordinates in Estimating the Value of Fire by the U.S.C. Method of Procedure." "New Probable Cause of the Deviation of the Compass on board Ships." "In Memoriam:—Her late Majesty Queen Victoria." "Naval Notes."

AUSTRIA-HUNGARY.—*Mittheilungen aus dem Gebiete des Seewesens.* No. 3. Pola: March, 1901.—"Tactical Remarks on the Double Echelon System for Manœvring a Fleet." "Methods of Firing Guns Singly." "English War-Explosives." "The French Budget for 1901." "Naval Notes."

BRAZIL.—*Revista Maritima Brazileira.*—Rio de Janeiro: January, 1901.—Has not been received.

FRANCE.—*Revue Maritime.* Paris: January, 1901.—"The Equilibrium of a Ship with a Liquid Cargo." "A Study on the Shock caused by the Impact of Two Moving Bodies." "Care for the Wounded During and After a Battle." "Our Ships of War and their Predecessors" (*continued*). "The Battle of Santiago." "Military Position of the Workmen in the Arsenals." "Coaling at Sea." "The 'Formidable.'" "The English Admiralty." "The Norwegian Torpedo-boats 'Delfin,' 'Haï,' and 'Hwai.'" "Foreign Naval Notes." "The Mercantile Marine."

Le Yacht. Paris: 2nd February, 1901.—"The Sale of the Seven Islands." "Yachting Notes." "The Naval Reserve." "The French Navy League." "Foreign Navies in 1900" (*concluded*). "The Mercantile Marine: French and Foreign." 9th February.—"The Military Rôle of the Loire." "Yachting Notes." "The Funeral of Her Majesty the Queen of England." 16th February.—"The Engineer Officers." "Yachting Notes." "Trials of a New Hydraulic Propeller." "The Organisation for Life-Saving in the Mediterranean." 23rd February.—"The Engineer Officers" (*concluded*). "Yachting Notes." "Goubet No. 2 at Toulon." "English Second-class Cruisers: The 'Arrogant' Class." "*À propos* of Sculls."

Le Moniteur de la Flotte. Paris: 2nd February, 1901.—"For the Warrant Officers." "The French Navy League: Discussion:- 'The Maritime Power of Germany.'" "The Condition of the Mercantile Marine." "The Professional Naval Schools." "Chinese Affairs." "Maritime Disasters in 1898." 9th February.—"Mercantile Marine Captains and the Cadre of Reserve Officers." "The Navy in Parliament." "The French Navy League." "Chinese Affairs." 16th February.—"The French Mercantile Marine in 1900." "The Navy in Parliament." "Chinese Affairs." "Insufficiency of Recruits for the Fleet." "The Loss of the 'Caravane.'" 23rd February.—"Mercantile Marine Captains and the Cadre of Reserve Officers." "An Italian Squadron at Toulon." "The Manufacture of Powders."

La Marine Française. Paris: 15th February, 1901.—"The Teaching of 'Our Fatherland' on board our Ships." "Submarine Cables in Time of War." "The Reorganisation of Work in the Dockyards." "God and My Right." "When War shall be Declared."

GERMANY.—*Marine Rundschau.* Berlin: March, 1901.—"The Foundations of Success at Sea." "Some Remarks on the Question of Triple-screwed Ships." "Nordelbisch-Danish." "The War Value and Fighting Value of Ships." "The Armoured Cruiser—a Compromise Ship." "The Construction of a French Network of Cables." "Discussion on the Lectures—'The Complement of Naval Officers,' and 'Something on Winter Work and Lectures.'" "A Reply to the Proposal for a German Naval Cadet Corps." "Foreign Naval Notes."

ITALY.—*Rivista Marittima.* Rome: February, 1901. — "Quod Justum est Judicate." "Some Life-saving Apparatus at the Paris Exhibition, 1900." "Corrosion in Boiler Tubes." "Naval Science in the Nineteenth Century." Letters to the Director:—"Torpedo-Boats—Past and Future." "Foreign Naval Notes."

PORTUGAL.—*Rerista Portugueza, Colonial e Maritima.* Lisbon: January, 1901.—"Portugal and her Colonies" (*concluded*). "Colonial Agriculture" (*continued*). "The Provinces of Angola and the Independent Congo State." "Foreign Naval Notes."

SPAIN.—*Rerista General de Marina.*—Madrid: March, 1901.—"Some Ideas on Naval War." "Some Considerations on the Increase of the Naval Gun Factories." "The Navy League." "Study on the Origin and Historical Evolution of the Administrative and Judicial Jurisdiction of the Navy." "An Account of the Cruise of the 'Rio de la Plata.'" "The Japanese Battle-ship 'Mikasa.'" "Some Ideas on the Defensive in Naval Wars." "Application of Wireless Telegraphy for the Steering of Torpedoes." "Naval Progress of the Different Powers in 1900." "The 'Varese.'" "A Study on Modern Battle-ships." "Foreign Naval Notes."

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Proceedings of the United States Naval Institute. No. 4.—Annapolis: December, 1900.—"Errors of Gun-fire at Sea." "Our New Battle-ships and Armoured Cruisers." "The Influence of Submarine Cables upon Military and Naval Supremacy." "Porter's Position Verified." "A Stretcher for Wounded on board Ship." "Torpedo Safety Defence." "Operations in North China."

MILITARY.

AUSTRIA-HUNGARY.—*Militär-Zeitung.* Vienna: 7th February, 1901.—"The New Instructions for the Manufacture of Uniforms" "Military Religious Instruction." "The War in South Africa" (*continued*). 15th February.—"Staff Officers' Examination in the General Staff." "King Milan." "The Gun Foundry at Essen." 23rd February.—"Army Questions." "The New Medical Regulation." "Targets Representing Large Bodies of Troops." "The New Submarine." "The Entanglements in China" (*continued*).

Organ der Militär-wissenschaftlichen Vereine. Vienna: January, 1901.—"The Value of Spontaneity in Wars." "The Action of a Vanguard when in Touch with the Enemy."

Mittheilungen über Gegenstände des Artillerie- und Genie-Wesens. Vienna: February, 1901.—"Coast Gunnery." "Experimental Investigations with regard to the Ratio of Expansion of Powder Gases in Guns."

BELGIUM.—*Bulletin de la Presse et de la Bibliographie Militaires.* Brussels: 15th February, 1901.—"Two Questions regarding the Tactics of Siege Warfare" (*continued*). "The Anglo-Boer War" (*continued*). 28th February.—"Two Questions regarding the Tactics of Siege Warfare" (*continued*). "The Anglo-Boer War" (*continued*).

FRANCE.—*Le Spectateur Militaire.* Paris: 1st February, 1901.—"The South African War" (4 sketches, *continued*). "The Campaign of 1866" (2 sketches, *continued*). "The Ancient Corps of Marines" (*continued*). "The Campaign of 1809

(2 sketches, *continued*). "Trans-Sahara" (*continued*). 15th February.—"The South African War" (2 sketches, *continued*). "The Campaign of 1866" (*continued*). "The Ancient Corps of Marines" (*continued*). "The Campaign of 1809 (*continued*).

Revue du Cercle Militaire. Paris: 2nd February, 1901.—"Infantry under Artillery Fire" (*continued*). "The Transvaal War" (*continued*). "The Russian Forces in Manchuria." "Organisation of the Colonial Army" (*continued*). "A Paradox that is dying out." 9th February.—"General Guilleminot." "Infantry under Artillery Fire" (*concluded*). "The Transvaal War" (*continued*). "Organisation of the Colonial Army" (*concluded*). 16th February.—"How should Cavalry Attack Infantry?" "The Transvaal War" (*continued*). "The Changes of Battle." 23rd February.—"The Transvaal War" (*concluded*). "A Winter Reconnaissance by the 6th Battalion of Chasseurs." "The Changes of Battle" (*continued*). "Re-organisation of the United States Army."

Revue du Service de l'Intendance Militaire. Paris: January, 1901.—"Preserved Vegetables and Meats in Use in the Principal Armies." "Analysis of and Extracts from an English Work by Colonel G. A. Furse on the Organisation and Administration of Lines of Communication in the Field." "Algerian and Tunisian Wines."

February, 1901.—"Comparison of the Composition of Beef Meat in the various districts of France and the Colonies." "Utilisation in the Field of Cantonment Resources." "The Formation and Operation of two Swiss Administration Companies at the Manœuvres of 1900." "Analysis of and Extracts from an English Work by Colonel G. A. Furse on the Organisation and Administration of Lines of Communication in the Field" (*continued*).

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Revue du Génie Militaire. Paris: February, 1901.—"Calculation for the Bearing Power of the Pieces Composing the Framework of Military Bridges" (*concluded*). "Note on the Ventilation of certain Barracks." "Analysis of and Extracts from Vauban Correspondence" (*continued*).

Revue de Cavalerie. Paris: February, 1901.—"The Carrier Pigeon in the Cavalry." "Cavalry Corps." "The Russian Cavalry in the War of 1877-78" (*continued*). "The Lessons of the 16th August" (*continued*). "Our Horses of the South-West."

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GERMANY.—*Militär-Wochenblatt.* Berlin: 2nd February, 1901.—"Firing with Field Howitzers" (*concluded*). "The Boxer Insurrection in China" (*continued*). "Thoughts on the Arrangement and Conduct of the Manœuvres of Smaller Bodies of Troops." "France's North African Campaign." "The Belgian Army Manœuvres in 1900." "Promotion Prospects of Officers of the Austrian Army." 9th February.—"The Second Phases of the Boer War." "Thoughts on the Arrangement and Conduct of the Manœuvres of Smaller Bodies of Troops" (*concluded*). "Military Education and Training in Austria-Hungary." "The Norwegian Military Estimates for 1900-01." 13th February.—"Service Jubilee, 1901." "The Strategic Importance of Waterways

in general and of the proposed Russian Regulation in particular." "Draft of the Infantry Musketry Regulation." "Report of the Working of the Empress Augusta's Institution for German Daughters for the year 1900." 16th February.—"The French Manœuvres of 1900." "Draft of the Infantry Musketry Regulation" (*concluded*). 20th February.—"The French Colonial Infantry." "Mechanical Traction in the Boer War." "Free from Design." 23rd February.—"More Thoughts on the Arrangement and Conduct of the Manœuvres of Smaller Bodies of Troops." "The Boer War, Second Part." "Garrison Manœuvres." "Results of the Mobilisation of Russian Troops in China." 27th February.—"On the Scientific Education and Progress of our Corps of Naval Officers." "The French North African Campaign." "Inspections in the French Army."

Jahrbücher für die Deutsche Armee und Marine. Berlin: February, 1901.—"Colonial Troops." "The Remodelling of the Engineer and Pioneer Corps in the German Army." "History of the Austro-Hungarian Gendarmerie." "The Recruiting of the French Army in 1899." "French personal Criticisms on their Army Manœuvres of 1900." "Unusual Fate of a King's Statue."

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Neue Militärische Blätter. Berlin: 1st January, 1901.—"General von Fransecky." "The Past and Future of Austro-Hungarian Technical Weapons and Formations." "The Pom-pom in the Transvaal War." "Musketry Schools and similar Establishments in all States." 15th January.—"Contributions to the Knowledge of the Russian Army." "The Past and Future of Austro-Hungarian Technical Weapons and Formations" (*continued*). "Ehrhardt's Q.F. Field Gun C/1900." "The Field Post Letters and South Africa." 1st February.—"The French Army Manœuvres of 1900." "The Offices and Public Workshops required by Various Armies." "The English Navy at the Commencement of the Reign and at the Death of Queen Victoria."

ITALY.—*Rivista di Artiglieria e Genio.* Rome: February, 1901.—Has not yet been received.

Rivista Militare Italiana. Rome: February, 1901.—Has not yet been received.

PORTUGAL.—*Revista de Engenheria Militar.* Lisbon: January, 1901.—"Field Telegraphic Service in Portugal." "Some Remarks on the New Works at the Port of Lourenço Marques" (*continued*). "The Walls of Lisbon" (*continued*).

Revista de Infanteria. Lisbon: March, 1901.—"A Succint Account of the Results of Trials of Military Rifles carried out at the Practical School of Infantry for the Period of Instruction of 1899-1900." "Marches and Night Actions." "South Africa." "The Duello in Armies." "Autumn Manœuvres." "For Our Country."

RUSSIA.—*Voĕynni Sbórnik.* February, 1901.—Has not yet been received.

SPAIN.—*Memorial de Ingenieros del Ejército.* Madrid: January, 1901.—"Formula for Resolving the Equation $x^3 + y\,x + r = 0$." "Telegraphy: Model for Heliography." "Electric Automobiles."

Revista Técnica de Infanteria y Caballeria. Madrid: 1st February.—"The Cavalry Arm and Tactical Regulations" (*continued*). "A Study on the Indirect

Fire of Infantry" (*continued*). "The War of Secession: General Pope." "Instruction of Cavalry in Peace." "Is the Construction of a Harbour at Melilla Necessary?" 15th February.—"Trial of a Method of Instruction for Recruits." "Marches for Instructional Purposes." "The War of Secession: General Pope" (*continued*). "The Cavalry Arm and Tactical Regulations: The Use of its Weapons." "A Study on the Indirect Fire of Infantry" (*continued*). "The Lee-Metford and the Mauser in South Africa."

SWITZERLAND.—*Revue Militaire Suisse.* Lausanne, February, 1901.—"The Laws of War and the Hague Conference" (*concluded*). "The Flank Formation on the Field of Battle." "The Engineers." "The German Rifle Model '98." "A Tactical Scheme."

UNITED STATES.—*Journal of the Military Service Institution.* Governor's Island, N.Y.H.: January, 1901.—"Military Impedimenta." "Porto Rico." "Napoleonic Strategy." "Translations and Reprints." "Military Notes."

Journal of the United States Artillery. Fort Monroe, Virginia: January, 1901.—"Observations on Firing Expedients of Coast Artillery." "Land Defences of Manila Bay, 1st May, 1898." "The Second Boer War." "The Study of Sea Power" (*translation*). "Graphical Comparison of the Efficiency of Naval Guns." "The Development of Krupp Field Artillery Material" (*translation*). "A Comparison of the Holden and Smith Chronographs." "Professional Notes."

NOTICES OF BOOKS.

Die Flottenführung im Kriege auf Grund des Doppelstaffel-Systems ("The Manœuvring of Fleets in War, based on the System of the Double-Échelon Formation"). By RUDOLF EDLER V. LABRÉS, Linienschiffs-Capitän, K. u. K. Marine. Berlin: Ernst Siegfried Mittler & Son, 1900.

In this treatise of over 400 pages of small type, with 260 illustrations in the text, and five plates, the author has endeavoured with a thoroughness and attention to detail worthy of all praise to reduce the formation, disposal, and management of ships and fleets in action, to a uniform system. He not only gives fundamental rules for the formation and manœuvring of fleets, but also shows how the same may be applied in an engagement with hostile ships and fleets.

Of the science of sea tactics the name only exists, as Captain Labrés says; and no organised attempt has previously been made to build up a theory of sea tactics governed by a few fundamental laws and regulations capable of universal application in manœuvring fleets and their divisions and units, both in peace-time and in the presence of the enemy. This want in maritime literature the author hopes to supply in the present work, which is the outcome of many years of close study and personal experience.

Of the fifty chapters into which the book is divided, thirteen are devoted to the formation of tactical units in divisions; five to the evolutions of these divisions; two to the formation of other tactical divisions; three to the formation of the whole fleet for cruising and for action, and eighteen chapters to the theory of sea-tactics. An appendix of eight chapters deals with the events of the last naval wars, the *matériel* of the fleet for action, and the training of the *personnel* for war purposes.

Captain Labrés contends that it is impracticable to give definite strategical rules for the disposition of the fleet and auxiliaries in the prospect of war, as the arrangements must be varied and various to suit the special circumstances of the case; but, on the other hand, the struggle between two fleets in contact will undoubtedly be continued under certain definite laws based on fundamental principles which it has been the writer's task to discover and formulate for the tactical manœuvring of fleets, flotillas, and single divisions in action. He treats in the first place of the principles governing

the "Formation," or the proper tactical arrangement of the material for the fleet, and then of the laws by which the tactical evolutions of such formations are governed. Finally, on the creation of those fundamental laws which regulate the movements of the fleets and their divisions, having regard also to the tactics of the enemy, in order to accomplish a definite end. The instruction under the three heads: The Formation, Evolutions, and Fleet Exercises, forming together what we know as the Science of Sea Tactics. It is impossible to do justice to the author's ideas within the limits of a notice, but the numerous diagrams by which they are illustrated are striking at once by their extreme simplicity as compared with the treatises on naval tactics ordinarily met with. This is due of course to the fact that the same principles of formation and manœuvring are rigidly adhered to thoughout, and although it is not likely that experts will agree entirely with all the arguments adduced in support of the system followed, there is unquestionably very much to be said in favour of any system of naval tactics in which all the complicated evolutions would be governed by a few definite and easily recognised rules, even though in individual cases the tactics might not be the very best which could be devised to meet the special circumstances of the case. One fundamental law which governs the whole system is that of the échelon formation, direct and inverted, whether in sub-divisions, divisions, squadrons, and fleets, either in single, double, or indented lines, and in columns, and squares, both for attack and defence. The échelon may be what the author calls "flat" or obtuse, that is, when the bearing of the line is at an angle of six points with the course, ordinary or "simple," with a bearing of four points, and the "acute" échelon when the bearing is two points. The échelon is "inverted" when formed on the flag-ship at the tail-end of the line. There is a very good chapter on the *rôle* of torpedo-boats in company with a fleet in action, and the tactics best suited to their employment; the vexed question of the employment of submarines is also dealt with. Considerable prominence is given to the employment of the ram and Whitehead torpedo; in fact, all the elements of attack and defence possessed by modern fleets are taken into consideration and given due weight in working out the various problems which are likely to arise in practice. There is no doubt that this complete treatise on naval tactics will be heartily welcomed in foreign Navies, and will be of the greatest service in giving officers an intelligent grasp of the theory and principles underlying the most important subject of naval study.

To those of our own naval officers who are sufficiently acquainted with the German language this book can be recommended as worthy of the closest attention and study, and it is to be hoped that a translation into English may shortly be available, in order that it may receive a wider circulation amongst us than would otherwise be possible.

The author points out in his concluding chapter that the closest study of this science of sea tactics is incumbent on all officers and it must be zealously promoted. It is not sufficient to go through the regular examination course in the Academy, but the subject must form a later and more thoroughly exhaustive course of study, more especially for those officers who will form the admirals' staffs, chief of staff, ship, division, and fleet commanders, etc. Promotion to those appointments will be the prizes awarded to the most experienced and best informed officers in this science.

Dix Mois de Campagne chez les Boers. Par UN ANCIEN LIEUTENANT DU COLONEL DE VILLEBOIS-MAREUIL. Paris: Calmann-Levy. 8vo.

It is difficult to review this book seriously. The author, who was only about six months in the fighting area in South Africa, says he is an inexperienced writer, more accustomed to wield the sword than the pen. This expression, which we have heard before, need not, however, lead us to suppose that the writer is a very experienced soldier, though he had served in the Soudan. This does not deter him in the least from expressing pronounced opinions upon things military in general and upon the Boer War in particular. The value of his judgment may be gauged from the advice which, he says, he gave to a field-cornet in regard to Cronje's retreat. This we give in his own words:—"At the commencement of the retreat a field-cornet came

to me to ask my advice, as sometimes occurs, but he did not follow my advice, which always happens. My suggestion was that during the retreat the reservoirs should be burst, the forage burnt, and the wells poisoned! Later, when I was a prisoner, an English officer of high rank, who had been in the march across the Orange Free State, said to me that he had suffered terribly from thirst at the time, and he assured me that if the measures I had recommended had been adopted the 40,000 troops led by Lord Roberts would never have achieved their task."

Is the officer who gravely narrates this aware of the existence of the Geneva Convention or of the custom of war among even uncivilised nations?

Is it possible that this is one of his little jokes? If so, it requires explanation, and a joke that requires explanation is proverbially dull.

The author is so evidently prejudiced against the British officers that his opinion of them is of little value. It is true that he says they are honourable, upright gentlemen, full of bravery and self-sacrifice, and of kindly care for their men. "They are perfect gentlemen, but scarcely officers." He tries to turn them into ridicule, mocking their love of games, of leisure, and ease; but this we seem to have heard before. It reads like a laboured and inferior imitation of Cherbuliez, and other French writers, who have all endeavoured in the same manner, that of a poorly written farce, to make fun of the English and their ways. There is no genuine ring about it, and after a while it palls. He is forced to acknowledge the extreme courtesy with which he was treated by the British officers after being taken prisoner, and it is a pity he could not have tried to imitate it. His attempt to throw ridicule upon the French pronunciation of one of the Colonial officers whose hospitality he had partaken of, is in the worst possible taste.

The book is, however, mainly written to sell in France. That must be borne in mind, and it would, perhaps, be more likely to sell well if it ridiculed British officers. The author affects throughout a light-hearted, jocular style, which, if a little strained at times, has its attraction for some readers. As a narrative of personal adventure, therefore—and it is mainly personal—it may serve to while away an hour and to afford a lively, if somewhat exaggerated, picture of the Boer leaders and their methods. He portrays their rough-and-ready character, mourns over their want of discipline, and is full of regrets at their inaptitude to take advantage of the many opportunities afforded them for "scoring off" the British, especially in the early part of the campaign. If they had been well led, they would have pressed forward in a vigorous offensive, which would have driven the English into the sea. Eight days' continuous effort would have enabled Natal and the Cape Colony to shake off the yoke and form with the Transvaal and the Orange Free State a United South Africa. Instead of this, they frittered away time and opportunities in the conventional bombardments of Ladysmith, Kimberley, and Mafeking. They made no use of their victory at Colenso, and the assault on Ladysmith on the 6th January was ill-planned and carried out with but little concerted action.

The author commences his narrative by a very condensed account of the preliminaries to the present war, which, it is needless to say, does not fail to dwell upon the aggressive and grasping policy of the British. He describes the great preparations made by the Boers and their steadily arming themselves with modern weapons of precision since 1895, and gives details, more or less accurate, of these. He dismisses in a few words the earlier actions of the campaign, condemning the incapacity of the British generals, and, ignoring his successes at Belmont and Enslin, exaggerates Lord Methuen's repulse at Belmont on the 10th November, which was in fact but a reconnaissance. He describes General Gatacre's reverse at Stormberg, "in which the attacking column is led without any warning to within 100 yards of the Boer trenches and is decimated." He does not even inform his readers that it was at night, so they might think it was blind blundering by daylight. There is no occasion here for exaggeration, as, of course, the main point of his criticism of this unfortunate affair, as regards the want of proper reconnaissance, is correct: but it is not the case that the greatest confusion prevailed at the outset. He dwells

upon the hypothetical letter of the lamented General Wauchope before the attack on Magersfontein, and deplores the apathy of the Boers after Colenso. He touches on the disaster of Colonel Watson at Colesberg, which, he says, "General French characterises as an *accident*—a newly-coined word describing an unsuccessful action."

Though the author speaks thus contemptuously of the British attempts to coerce the Boers in the beginning of the war, he is equally ready with disparaging criticism of our foes. He joined the French contingent under Lieut.-Colonel de Villebois-Mareuil, which was attached to the Boer forces carrying on the investment of Kimberley early in February. His description of the artillery duel carried out between the Long Tom (6·1-inch) Creusot (which had been disabled at Lombard's Kop before Ladysmith by a sortie from the British lines, but had been repaired, though shortened, by the Boers at Pretoria and removed to the trenches before Kimberley), with the 4·7-inch gun "Long Cecil," made in Kimberley on the Canet system, is interesting. He tells us how this huge Creusot gun—of 20 tons weight, he says—was mounted and fought. It was drawn to its position by a team of thirty oxen.

He gives an account of the Boer organisation, which he describes as very defective. The practice of *electing* the officers does not work, he says. It makes the latter timid in enforcing discipline, and in disposing of their men in action lest they should offend them and not be elected again. He speaks of the Johannesburg Police as the only corps possessing discipline at all, and says that their bearing shows what could have been done with the Boer forces had they been properly disciplined and trained. It will be remembered, however, that these police were all foreigners. He describes Commandant du Toit, who commanded before Kimberley, and the motley crew besieging that place, composed of all nationalities, many of whom, he hints, were attracted by the prospect of plunder. Moreover, the Boers knew Cecil Rhodes was in the town, "not having been able to flee from it with his treasures, but he had constructed a balloon in which to escape on emergency." He met Count von Sternberg (whom he persists in calling Steinberg), and gives a lively, not to say flippant, description of the incidents of the bombardment. His narration of the death of the celebrated engineer Léon, whom he much admired, is, however, rather pathetic.

The lieutenant was present at the action of Poplar Grove with his chief, Lieut.-Colonel de Villebois-Mareuil, afterwards killed by shell fire on 4th April at Boshof, and he speaks of the admirable courage of the British troops on that occasion. He says some thousands of Boers had dispersed to their farms and took no part in that engagement, in which the Boers lost 380 out of 950 men present.

He hastened to Bloemfontein after Poplar Grove and met, on passing through the town, several Englishmen and ladies in gay costumes, smiling pleasantly as they preceded in their lighter vehicles their more heavily equipped troops. In his intense grief at the loss of his gallant commander, of whom he gives a pleasant picture, and to whom he was evidently devoted, he throws out some dark hints of treachery on the part of some of the Boers, by which his death was brought about near Boshof. There was no evidence of this, though there is no doubt the Boer leaders were often jealous of the foreign officers. The lieutenant was himself not present, but heard of his death through Lord Methuen's telegram on 8th April and subsequent reports from the Frenchmen who were. Their reports showing how he met his death are given, with an appreciation of his services. The author gives an amusing account of the rapid way in which the Boers round Kimberley "cleared out" on the approach of Lord Roberts' forces, and some brief sketches of the actions that followed, of the confused retreat of the Boers, and of General French's rapid pursuit. He mentions the demoralisation of the Boer Irish Brigade at Kronstadt, and describes the entry of the British troops into Johannesburg with some satire.

The author was taken prisoner by some of the Imperial Light Horse in a skirmish near Irene on the 6th July, and was conducted to Johannesburg, where he

was most kindly received by the British officers. He was there during the discovery just in time of the famous plot, but he was not mixed up in this.

He was shortly after released on parole on condition of his returning at once to France, which he did.

It will be seen from the above short account of this book that, as a contribution to the history of the Boer War, it is partial and inadequate, even as a description of those few phases of it that the author took part in. It is desultory and disjointed throughout, and its accuracy leaves much to be desired. It is, perhaps, natural that he should translate G.C.I.E. as "Grande-croix d'Egypte," but that is a trifle.

He speaks of a grumbling Yeoman fresh from Colenso. We thought none of the Yeomanry were in Natal. His remarks about camps being left unguarded are made in error. Whether this book was worth translation is a question that may be left with the publishers

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Notes on Naval Strategy and Tactics. By Lieutenant H. STANSBURY, R.N. London: J. J. Keliher & Co., Ltd., 1900.

This valuable pamphlet is of peculiar interest at the present time, as showing that, in spite of the severe comments made by a certain class of writers on naval matters in the public press—mostly so-called civilian experts, by the way—on the supposed indifference of the young naval officer to a scientific study of his profession, there are some among their number who have taken the trouble to master the great principles of strategy and tactics as applied to naval warfare, and Lieutenant Stansbury can fairly lay claim to being one of them.

The author devotes the first part of his brochure to a brief survey of strategy, and he deals with its laws, the question of "Permanent and Temporary Bases" and the "Disposition of Forces" clearly and concisely. In Part II. he discusses Tactics in their different phases of "Scouting," "Fleet Actions," "Single Ship Actions," etc., and he recognises the importance of the first-named much neglected branch, as far as our Navy is concerned, of his subject by devoting several pages to it. He defines the duties of cruisers employed as scouts, and advocates, under certain circumstances, of the system first adopted by the French, of "Curves of Search."

Treating of "Fleet Actions," Lieutenant Stansbury is an advocate for the formation of "single line ahead," as the best adapted for developing the maximum fire, with the ships steering such a course that their after guns will bear on the enemy, and he arrives at the following general conclusions :—

1. That it is most unlikely that a modern battle will be reduced to a "mêlée," as a large number of people apparently believe.
2. That an admiral need never lose control of his fleet during an action.
3. That on gun-power will rest the ultimate victory, as the winner in the artillery duel need never allow his opponents to get to close quarters except under the most adverse conditions for them.
4. That a fleet properly handled and kept well under control will possess an immense advantage over one that is not.
5. That the best formation for delivering the heaviest fire is single line ahead, which is therefore, the best formation for going into action.

The author's concluding paragraph is one with which most officers in these days will be in full agreement :—

"But whereas strategy is a science and thus capable of mathematical solution and of accurate calculation, tactics is an art, and no amount of book study will make a perfect tactician, any more than it will make a perfect swordsman. Practice in handling ships and carrying out tactical operations, with a quick eye for detecting opportunities, are essential qualifications for a tactician, and the most a book can hope to do to help him is to give a few principles and laws for his guidance in selecting weak spots in his opponent's guard and for strengthening his own attack and defence."

We may add that Lieutenant Stansbury's pamphlet is well worth studying.

Simple Lectures for Company Field Training. By Major A. W. POLLOCK. Second Edition, revised and enlarged.

Major Pollock has done well in issuing another edition of his useful little book on "Company Field Training," not only because the first edition has proved of value to those for whom it was intended, but because, to a sound theoretical knowledge of the subject of which he treats, the author is now able to add the still more valuable experience acquired by a personal acquaintance with modern war. It must, no doubt, have been gratifying to Major Pollock to find that those experiences in so many respects confirm his former views, and enforce the lessons that he has sought to convey.

It is, moreover, a satisfactory tribute to the consensus of military opinion of the present day, which attaches so much importance to company training, that the author should devote the first-fruits of his own experiences to this subject, in the place of following the popular lead and dilating on Army reform, or formulating a new system of tactics, or evolving an attack formation warranted proof against all modern weapons.

The subject on which Major Pollock pleasantly and profitably discourses is of primary importance, and the sooner the truth is realised that the company, and not the battalion, is henceforth the unit of instruction in warfare, the better the prospect for the future training of the Army. We may hope that, instead of for a brief twenty-one days, a company may in the future be at the disposal of its captain throughout the year, except when actually required for battalion or brigade exercise.

Colonel Lonsdale Hale recently drew attention to the lack of power of imparting what they know and what they want to teach, exhibited by our senior officers generally, and instances a particular occasion of a conference at which a general of unready speech, mounted on an unsteady horse, presided, and caused the experienced *coach*, as he himself tells us, to wish himself in the general's place, on a quiet horse, *bien entendu*, simply because, though he had not been taught to ride, he had been taught to teach. Those who have listened to our *post*-field-day orations will endorse the opinion that great opportunities for instruction are lost on those occasions for want of a practised instructor. There can be no doubt that books such as these "Simple Lectures" of Major Pollock are of great service in teaching officers how to teach, and in enabling them to put before their men the lessons they wish to convey, in a lucid and interesting manner.

A diagram illustrating certain principles involved in the attack of a position is given, which the author is careful to tell us "must be taken strictly for what is intended": but even though it may invite criticism on certain points, it may probably on this very account effect the more good by exciting the desire to thrash out the problem thoroughly. Further examples of this interesting form of illustrating general principles might, we think, have been added with advantage.

In the parts relating to the actual instruction of a company there is necessarily not much room for originality, but all is well and clearly put, and the reading will benefit all who read to learn.

But, perhaps, the most important part of Major Pollock's little book is contained in the chapters on "Infantry in Modern War" and "Lessons from the Boer War." The author recognises the deliberate nature of the advance that will characterise the future attack, and lays stress on the necessity of occupying with portions of the force successive fire positions whence the advance of the remainder may be covered, and remarks that "in Aldershot attacks no one cares twopence for local situations," which has been hitherto unfortunately too true. Much importance is attached to the "common-sense use of ground," and to their expertness in this respect the successes of the Boers are attributed rather than to good shooting.

Not the least useful part of this very useful little book is the appendix on "The Battle Drill of Infantry," which is something of a *spécialité* of the author, and which contains some very practical ideas.

The book is one to be commended to all who believe in the building up of our military training in a systematic manner, on a sound foundation.

PRINCIPAL ADDITIONS TO LIBRARY DURING FEBRUARY, 1901.

Die Flottenführung im Kriege. By RUDOLF VON LABRÉS. 8vo. Berlin, 1900.

The Sailors' Hand-Book. By Admiral Sir F. G. D. BEDFORD. Demy 12mo. Portsmouth, 1890.

Lichfield Garrison Standing Orders. 8vo. Lichfield, 1895.

Standing Orders of the 38th and 64th Regimental Districts. 8vo. Lichfield, 1895.

Ten Months in the Field with the Boers. By an EX-LIEUTENANT of GÉNÉRAL DE VILLEBOIS-MAREUIL. English Translation. 8vo. London, 1901.

Histoire de la Conquête du Soudan Français, 1878-1899. By Lieutenant GATELET. 8vo. Paris, 1901.

South African Despatches. Official. Vols. I. and II. F'cap fol. London, 1901.

Le Laos Français. By EUGÈNE PICANON. Crown 8vo. Paris, 1901.

La Guerre de la Succession d'Autriche (1740-1748)—Campagne de Silésie, 1741-1742. By Le Major Z***. 8vo. Paris, 1901.

Modern Abyssinia. By AUGUSTUS B. WYLDE. 8vo. London, 1901.

Emploi de l'Artillerie de Campagne à Tir Rapide. By GABRIEL ROQUEROL. 8vo. Paris, 1901.

1st Vol. Batt. Hampshire Regiment Gazette for 1900. Demy 4to. 1901.

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Mount Omi and Beyond. By ARCHIBALD J. LITTLE, F.R.G.S. 8vo. London, 1901.

Bibliography of Military Books up to 1642. By M. J. D. COCKLE. Imp. 8vo. London, 1900.

With both Armies. By RICHARD HARDING DAVIS. 8vo. New York, 1900.

Idées Pratiques sur le Service de la Cavalerie. Traduit de l'Allemand. By General VON ROSENBERG. 8vo. Paris, 1898.

South Africa and the Transvaal War. By LOUIS CRESWICKE. Vols. I., II., III., IV., and V. 8vo. London, 1901.

Yeomanry Cavalry or Mounted Infantry. By L. ROLLESTON. 8vo. London, 1901.

The Siege of Kumassi. By Lady HODSON. 8vo. London, 1901.

First on the Antarctic Continent. By C. E. BORCHGREVINK. 8vo. London, 1901.

Le Sultanat d'Anjouan. By JULES REPIQUET. 8vo. Paris, 1901.

La Première Campagne d'Italie (1795-1798). By EDOUARD GACHOT. 8vo. Paris, 1901.

British Regiments in War and Peace.—I. The Rifle Brigade. By WALTER WOOD. Crown 8vo. London, 1901.

Australia at the Front. By FRANK WILKINSON. Crown 8vo. London, 1901.

Through Siberia. By J. STUDLING. 8vo. London, 1901.

Charles William Ferdinand, Duke of Brunswick: An Historical Study, 1735-1806. By LORD EDMUND FITZMAURICE. 8vo. London, 1901.

Geschichte des Grenadier-Regiments König Friedrich I. By KOPPA VON LOPSOW. Vols. I. and II. 8vo. Berlin, 1901.

International Law. By F. E. SMITH. Demy 12mo. London, 1901.

List of the Officers who have Served in the Madras Artillery from its Formation to 1861. By MAJOR J. H. LESLIE. Demy 4to. 1900.

FIELD-MARSHAL THE RT. HON. FREDERICK SLEIGH, EARL ROBERTS,
K.G., K.P., G.C.B., G.C.S.I., G.C.I.E., V.C., Commander-in-Chief.

J. J. K. & Co., Ltd., London.